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A COMPARATIVE STUDY OF DAY CLASS VS. INSTITUTIONALIZED EDUCABLE RETARDATES.

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THE PRESENT STUDY REPRESENTS AN EXTENSION OF A STUDY WHICH DEALT WITH THE LATER ADJUSTMENT OF INDIVIDUALS DISCHARGED FROM A STATE INSTITUTION FOR THE MENTALLY RETARDED. THIS EFFORT REWORKED AVAILABLE DATA TO DEVELOP A MORE EFFICIENT TECHNIQUE OF PREDICTION AND TO STUDY FURTHER INTERACTIONS AMONG THE VARIOUS CHARACTERISTICS OF THE GROUP. IN ADDITION, IT COMPARED THE ABOVE POPULATION WITH THE RATE OF INSTITUTIONALIZATION FROM DISTRICTS HAVING SPECIAL CLASSES AND DISTRICTS WHICH LACKED SUCH CLASSES, AND COMPARED POPULATION NOW IN THE INSTITUTION WITH A COMPARABLE POPULATION IN DAY CLASSES. THESE DATA WOULD BE USED FOR LATER FOLLOWUP STUDIES. (JL)

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A Comparative Study of Day Class

vs.

Institutionalized Educable Retardates

Cooperative Research Project No. 192*

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and

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Preface

The authors wish to express their indebtedness to many individuals for support in this truly cooperative research project. First, we would like to thank all taxpayers, without whose financial aid this project would not have been possible. Second, we would like to thank the U. S. Congressmen who enacted the legislation under which aid was extended. For their direct assistance in initiating and conducting this project, we would also like to thank the Cooperative Research Staff and other persons in the U. S. Department of Health, Education, and Welfare.

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The University Printing Department is to be thanked for efforts in presenting this report according to their usual high standards.

Although many persons have given us help, we nevertheless assume full responsibility for the adequacy of our design, study, and final report. Any errors in conclusion the reader should discover, although we hope there are none, are to be considered our own rather than partly those of the persons who helped us so greatly with their time and advice.

June 30, 1960
Minneapolis, Minn.

M. C. R.
C. L. S.

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CHAPTER 1

An Overview of Project

INTRODUCTION

This study has two major objectives: (a) to provide improved means for predicting the adult status of educable retarded individuals and (b) to contrast some of the conditions associated with institutional and community education and care of educable retarded children. Both objectives bear upon planning for educable retardates in general and attending to the individual needs of each retarded person.

Educable retardates are considered mentally retarded persons who are "capable of some degree of achievement in traditional academic subjects such as reading and arithmetic . . . . [and] who may be expected to maintain themselves independently in a community as adults" (39, p. 98). They make up the largest and least differentiated subgroup of mentally retarded individuals.

Although it is widely agreed that most of these retardates should be educated in local public schools, many are institutionalized. The institution does serve as both protection for the public and a resource for care, training, and education of the resident. Concerning its ability to provide for each child, there are at least two schools of thought: one emphasizes the positive potential of the institutional setting; the other stresses negative aspects of the institution and advocates placement there only as a last resort.

Sarason and Gladwin (68) consider possible psychological implications: "Institutionalization involves a drastic change for the individual and there is every reason for assuming that it is experienced as a stressful one involving (a) separation from loved or familiar figures (b) pressure to adjust to a completely new physical and interpersonal (peer and adult) environment (c) confusion and resentment about their helplessness (d) anxiety in relation to the future" (p. 374).

In deciding whether to institutionalize, they say, we should consider three main factors: (a) marital relations—whether the retardate is disrupting the home or affecting other children there adversely, (b) the neighborhood, and (c) the "scope and quality" of the community's educational resources. They say the decision must not be made by assigning weights to these factors, but by considering the total situation.

The Expert Committee on Mental Health (86), convened by WHO in 1954, agrees that "as a general rule home care is to be recommended, unless the subnormality is very severe or the retention of the child in the home is likely to bring about serious maladjustment or the dislocation of other aspects of family life." The committee would consider these factors in making each decision: ". . . the actual condition of the child; the mental health of the family, the competence of the mother, and the possible effect on the family of retaining a subnormal child in its midst; and the living conditions and financial circumstances of the family" (p. 16).

Wallin (82) also stresses effects on the family's mental health. He states, "The best place and agent for the care and nurture of any child are his own home and his own parents if they are fit and responsible" (p. 68). He mentions these other factors favorable to the special class: (a) institutional costs are high; (b) institutional facilities may be inadequate; (c) parents may refuse to send their child away; (d) the institution may provide inferior instruction; and (e) mistaken diagnosis may have long-term effects on a child institutionalized unnecessarily.

Engel (22) stresses positive aspects of institutionalization, although her criteria for deciding where to place a child are similar to those of Sarason and Gladwin. She adds the importance of behavior problems. For the serious behavior problem group, she points out, a school day longer than five hours is necessary, and institutionalization becomes imperative.

"The institution provides a certain psychological setting," she quotes from Elise Martens. "For instance, it provides routine and regularity, it provides a span of attention, etc., way beyond what any family can provide. These things need to be understood by all social agencies. Once this philosophy is understood, certain types of children will be sent immediately to institutions because they are best treated there. I do not feel that you are ever fighting anything but a losing battle as long as children go to institutions because there is nothing else to do with them" (p. 306).

Engel suggests two principal criteria for institutionalization: (a) continued serious delinquency and (b) undesirable home influence.

Whitney (85), too, points out the value of the 24-hour care an institution provides. He says many serious problems stem from "out-of-school" activities. The child, according to Whitney, does not feel unwanted in the 24-hour program, whereas stigmatizing hostility may develop in a special class. Whitney does not discuss the problem of removing the stigma of institutionalization upon the child's release.

Tredgold (78) recommends that vocational or technical training take place in private "approved homes" or in one of the larger institutions. He apparently feels this is desirable for all defectives whose vocational adjustment is anticipated. He implies that boarding schools may be helpful even when the home situation is adequate.

Actually, the question is not only what *can* the institutional setting provide, but also what *does* it provide. A very real difference may exist. However, the ultimate answer to the last question lies in factors not within the child but in the setting where he lives. All investigators seem to agree that if the child is in a rejecting, psychologically inadequate home, institutionalization—or some other type of "substitute home"—should be recommended. Sarason and Gladwin's (68) statement on this, however, is particularly pertinent: "What to us is a psychologically unfavorable family situation, and what may even be an unpleasant one to the child, may in the process of institutionalization be perceived by the child as his only source of security" (p. 375). How much of this security are we willing to sacrifice, or can we replace and add to, in the institution?

In summary, when deciding whether to institutionalize a child, investigators consider many factors besides intelligence. Most stress the importance of the home. However, no one has yet constructed objective criteria or predictive devices to tie these suggestions to concrete, observable behavior. Also, some apparent disagreement between authors appears to result from varying experiences with different types of institutions, special classes, and retarded children.

Special class facilities for educable retardates are increasing rapidly in local communities. Special classes and institutions each offer the child a different kind of experience. For each child, the decision to choose one of these facilities over the other is especially crucial when institutional programs are very expensive or available to only a few. These situations exist in Minnesota and many other states. Minnesota has a special residential school for educable retardates, the Owatonna State School. This school, however, can accommodate only about 350 students. The cost of maintaining each student is high. With a large supply of possible students, how should selections be made? Administrators need some predictive technique that will maximize the "social return" of this very expensive institution.

One purpose of the present study is to determine what kind of development takes place in institutional and special class populations. Information on the advantages each facility provides may lead to more accurate instruments to determine what type of child can use each facility best. If investigators can find ways to predict adult outcomes, we can place children with greater confidence. And, if they can specify conditions which predict unfavorable outcomes, we can better determine where further experimental work is needed most.

THE PREDICTIVE STUDY

To accomplish the first major objective of this project, improving means for predicting the adult status of educable retardates, the investigators made an intensive, retrospective follow-up study of all dischargees of the Owatonna State School during its first nine and one-half years of operation. This study determined the 1957 status of two groups of retardates studied earlier by Reynolds and MacEachern (**65**).

Between July, 1945, and January, 1955, inclusive, 500 persons were discharged from the Owatonna school. Those still under state guardianship[1] were rated as to the quality of adjustment they had made after leaving the institution. Two questionnaires were developed for this study, one for institutionalized wards and another for wards in the community. One paramount item was established on each form to evaluate the individual's adjustment between July, 1956, and June, 1957, inclusive. Other items concerned important components of the overall adjustment. Items on the institutional and community questionnaires were similar with regard to facets of adjustment, but they were constructed differently because of differences in living situations.

For each subject, data on status at the time of the follow-up study were related to pre-institutional data (average time between placement at Owatonna and the follow-up study was 10 years). Total follow-up adjustment ratings were related to ratings on specific items of follow-up adjustment. Finally, follow-up status data and pre-institutional data were used in a discriminant function analysis to determine equations for predicting post-institutional status from pre-institutional data. In this determination, the total group was divided, and equations obtained in one group were checked by prediction in the other. This phase of the study was useful in setting guidelines for the comparative study.

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[1] All residents of the Owatonna school are wards of the state (i.e., are under guardianship of the state commissioner of welfare) and continue as such after release, unless they are discharged through court decision.

THE COMPARATIVE STUDY

To accomplish the project's second objective, contrasting conditions of institutional and community care and education, investigators sampled children under both types of care. Samples were drawn from populations only in Minnesota, due to administrative limitations. To insure proper distribution of achievement scores on initial testing, no child younger than 11 years old was selected; because of the nature of Minnesota's compulsory school law, no child selected was older than 15. The sample was drawn in Fall, 1957; subjects' birth years were between 1942 and 1946, inclusive.

The institutionalized sample consisted of all children with appropriate birth years who were enrolled at the Owatonna school in Fall, 1957. There were 158 such children.

The community sample consisted of a stratified cluster sampling of special class students enrolled in public schools. Used to determine which classes of pupils should be considered were Annual Attendance Reports and Special Class Cards on file with the Minnesota State Department of Education. Data for 1957-58 were not available; those for 1956-57 were substituted. The sample contained 173 subjects—approximately 10% of all special class students with appropriate birth years.

Both groups were tested on individual intelligence and initial achievement in reading, spelling, and arithmetic. They were also rated on certain personality characteristics. Biographical information was collected. After 16 months, all subjects were retested in the achievement areas.

Data were analyzed to determine which characteristics distinguished boys from girls and institutionalized subjects from special class subjects. Initial, retest, and gain scores were examined as well as scores on personality and intelligence measures. Within the institutionalized group, subjects from communities which provided special classes were compared with subjects from communities which did not.

CHAPTER 2

Review of Literature

GENERAL REMARKS

The present study is divided into two parts: (a) a predictive, follow-up study of dischargees of the Owatonna State School and (b) a comparative study of retarded children in the institution and the community. As a background for the follow-up study, this chapter contains a review of other follow-up studies on the mentally retarded. Since the Wechsler Intelligence Scale for Children (WISC) was administered to all subjects in the comparative study, the chapter also contains a review of WISC research.

The review of follow-up studies is by no means exhaustive. However, it is representative of major research in the area. The studies have been grouped under four major sections: (a) economic and vocational adjustment, (b) social adjustment, (c) factors related to adjustment, and (d) prediction.

Studies discussed in the first section deal mainly with how many retardates find jobs after their training and what kinds of jobs they fill. Those discussed in the second consider what retardates do with their spare time, what their marriage rate is, how many commit illegal acts, etc. Those in the third consider factors which relate to retardates' social and vocational success. The study of such factors should be important in developing instruments for predicting success, the history of which is sketched in section four.

Some of the studies in this review deal with retardates who attended special classes; others deal with dischargees of institutions. The studies are not directly comparable, even though subjects may fall in the same IQ range. In general, society expects more of the special class student: hopefully, he will be under social supervision a comparatively short time; he should receive different training and have different life experiences. Also, society will want to place in the special class only persons she considers socially responsible. The community that maintains for retardates both an institution and special classes will probably send the more socially deviant persons to the institution. This raises another problem in comparing studies: there may be danger in comparing test groups from different institutions, since the social history of each population may be considerably different.

The reader must also remember that educable retardates, from institutions and special classes, are not representative of the entire population with intelligence test scores in the same low range. Statistics tell us that far more persons fall into this range than are clearly identified and labelled retardates. This is particularly true when talking about early studies of institutionalized retardates. It might be expected, too, that the population in our institutions has changed considerably since the completion of many studies undertaken in the 1930s. There is evidence that institutionalized populations are older and are composed of more severely retarded persons. Part of the reason may be that the increasing complexity of society has affected the ability of individuals to adjust.

Changes in our nation's economic structure, particularly opportunities for employment, have probably affected the retardate's ability to find work. Since the 1930s, employment rates have been generally quite high, but new types of jobs have been created, and the proportion of simple jobs seems likely to have been reduced.

Bell (8) has investigated the change in percentages of workers in different jobs from 1870 to 1930. According to his study, the number in agriculture dropped from 58.1% of all workers to 25.1%. The number in manufacturing rose from 20.7% to 32.1%; the number in transportation, from 4.9% to 9.4%. Undoubtedly, there have been continuing shifts since this time. Such changes make it necessary to evaluate critically the results of past studies and constantly revise our expectations for the retardate.

FOLLOW-UP STUDIES

Economic and Vocational Adjustment

What happens to the person who, at one time, was labelled mentally retarded? What per cent of retardates, from institutions and special classes, make a satisfactory adjustment? This section on vocational adjustment considers how many retardates find employment and what kinds of jobs they fill. Factors that seem related to vocational success will be considered later.

Many investigators have tried to discover what kinds of work society will let the retarded do. Michal-Smith (53) corresponded with 200 directors of institutions for the mentally retarded and 200 personnel directors of industries throughout the country. He asked whether they thought retardates would be successful in four major occupational areas: manual, repetitive, machine-operative, and social. He defined "successful" as doing average or above average work. Of the 400 directors, 90% thought retardates would be successful in service work or labor; about 60%, in operating non-mobile machines; about 40%, in operating mobile machines; about 45%, in public contact work. There was general agreement between institutional and industrial respondents, although heads of institutions tended to rate retardates successful slightly more often.

The validity of this information is questionable, however, since no clear definition of the type or degree of retardation is given. It is not known whether the personnel directors were rating on the basis of their own experience in hiring or on the basis of some stereotype of a mentally retarded person. In any case, Michal-Smith's study makes it appear that being labelled retarded is not too great a handicap in being hired for a laboring job; i.e., 90% of the raters thought retardates would be successful in this work. However, no attempt was made to find out how many personnel directors actually had hired retarded persons, and, perhaps more important, how many would equally consider a retardate if a "normal" person were applying for the same job.

A study by Young (87) relates closely to this problem of willingness to hire retardates. To determine the academic requirements, Young analyzed every job retardates were holding in Connecticut—118 jobs in all. He listed the reading, writing, oral language, mathematics, and spelling skills required for jobs in these areas: (a) food preparation and service; (b) laundry and cleaning; (c) motor vehicle operation and service; (d) hospital and institution work; (e) building operation, maintenance, construction, and service; (f) office, department, and small store work; (g) factory production; and (h) personal service and miscellaneous. Young's study tells us something about what personnel directors do in practice, as well as what they expect.

After they have left school, it appears that most retardates can find jobs. In 1929, Foley (25) studied 375 male and 261 female dischargees of the Rome State School. Of the males, all but 76 had worked at some time. Only 20 had received financial help. Of the females, 110 were doing housework or waitress work, and 98 were not working or were working in their own homes. Nineteen had received financial help.

A number of studies have been made on graduates of the special class. In 1953, Bobroff (10) followed up a random sample of 121 retarded persons 12 years after they had left special classes in the Detroit Public Schools. Of the males ($N=92$), 27% were working in unskilled areas; 34%, in semi-skilled; and 16%, in skilled. Only 8% were unemployed. The mean wage for the males was $2.08 per hour, only slightly lower than the average for production workers in manufacturing ($2.23 per hour). About 50% of the working group had been with the same employer seven or more consecutive years. Only 3% had ever received aid from the welfare department, and 81% were making regular savings. The group had received some special vocational training, but apparently no more than special class pupils at the Detroit schools received typically. The group had been divided for training: some students (mean IQ 67) had received academic and vocational training apart from normal students; others (mean IQ 72) had received only academic training in the special class.

In Cleveland, 1928, Ringle (66) located 181 male graduates of special classes. She found 121 employed. Fifty of these worked as factory laborers; 11 did skilled work in factories; 11 worked as busboys; and smaller numbers worked as messengers, etc. All but two had an IQ within the 50 to 70 range. Of the 55 to 70 IQ group, 70% were earning their own living.

In Scotland, Ferguson and Kerr (23) found that of a group of special class students who had been out of school about nine years ($N=203$), approximately 12% were unemployed. About 63% were doing unskilled work; 16%, semi-skilled; and 8%, skilled.

Several investigators have compared retardates who have left special classes with a control group of normal persons. In 1935, Baller (5) compared 196 retardates (mean IQ 70) from special classes in Nebraska with a group of 202 normal persons paired on CA, sex, and nationality. About one-third as many retardates were self-supporting. Of the 107 retarded males, 17 held relatively permanent jobs, and 65 had been employed less than six months. Of the 124 normal males, 69 held relatively permanent jobs, and 10 had been employed less than six months. Of the employed retarded males, 38 held odd jobs; the next highest number, 16, were laborers. Of the retarded females who were employed, 40 worked at housekeeping.

Kennedy (46) compared 256 morons (IQ between 45 and 75) with 129 nonmoron controls matched on CA, sex, nationality, and residence in one section of a Connecticut city. She reported in 1948 that 75.5% of the moron group were self-supporting, whereas only 68.8% of the controls fell in this category. Of the moron group, 83.7% were in laboring occupations, compared with 56.1% of the controls; in clerical and sales work, 3.7% of the morons and 25.6% of the controls; in professional or managerial work, 1.2% of the morons and 10.4% of the controls.

In England, in 1954 and 1955, Collmann and Newlyn (19) compared a group of educationally subnormal ex-pupils with a mentally dull group and a mentally normal one. Of the subnormal ($N = 223$), mean IQ 61, 39% were doing unskilled work; 48%, semi-skilled; and 1%, skilled. Twelve per cent were "unemployable"—had never sought employment. Of the mentally dull ($N = 200$), mean IQ 82, 24% were doing unskilled work; 44%, semi-skilled; and 31%, skilled. Only 1% were unemployable. The normal group consisted of 106 graduates of vocational secondary schools (a random stratified sample of one-fourth the total graduates). Their mean IQ was 99. Ten per cent were doing unskilled work; 26%, semi-skilled; and 63%, skilled. Only 1% were unemployable.

Results of these studies cannot be compared, but it is interesting to consider the percentage of retardates in each study that were considered to have made a satisfactory vocational adjustment. Most reports state that over 50% make a satisfactory adjustment regardless of the criteria used.

In analyzing the comparative studies, one can readily see that IQ is not the only determinant of an individual's future adjustment. Baller (5) found that about two-thirds more of his control group were wholly self-supporting; however, only 27% of the retarded group were self-supporting, considerably less than many other studies indicate. Collmann and Newlyn (19) found that about 61% of the subnormal group, 89% of the dull group, and 94% of the normal group were classified as successful in their jobs. About 16% of the subnormal were classified as total failures, compared with 2½% of the dull and none of the normal. Other employed subjects were classified as partially successful. On the other hand, Kennedy (46) found that 75.5% of her retarded group were self-supporting, somewhat more than in the control group. Although many differences do exist between the control and experimental groups, it is interesting to consider the many factors in which differences between groups were negligible, particularly in the social adjustment area, which will be discussed later in that context.

A somewhat separate problem is that of relating IQ to job level. The studies already mentioned shed some light on this problem. Collmann and Newlyn (19) found that as IQ level increased so did the proportion of workers in skilled professions. Only 1% of their educationally subnormal group were working at skilled jobs, compared with 63% of the normal group. Of Kennedy's moron group (46), 83.7% were in laboring occupations, compared with 56.1% of the control group; in clerical and saleswork, 3.7% of the morons and 25.6% of the nonmorons; in professional or managerial work, 1.2% of the morons and 10.4% of the controls.

Bell (8) reports percentages of occupations requiring certain amounts of education. At the time of his study, 1940, 47.1% of the 2,216 occupations he studied required no educational training except the ability to speak, read, and write English. Unfortunately, the group was not broken down to describe the degree of each skill required. Only some elementary school was necessary for 7% to 8% of the jobs; 12.1% required elementary school graduation. These figures, however, are percentages of the total number of jobs; they give equal weight to each job, regardless of the number of persons employed in it.

Although there are limitations to the study of Guralnick (34), he found that 84% of a successfully rehabilitated group assigned to a vocational counsellor had IQs between 60 and 75, whereas 37% of the total group had IQs below 59. From this he inferred that few persons with IQs below 59 can benefit from vocational rehabilitation services. However, there is some bias involved, since few of his subjects with IQs below 59 were considered for rehabilitation. That is, they were placed in the "unfeasible" group immediately, and therefore they never received service.

Relating IQ to job level is an important area for study. Results should be useful in vocational counselling as well as consideration of the type of training likely to be successful for each retardate.

Social Adjustment

Considering retardates' social adjustment, we are faced with the problem of adequate criteria. Some attempts have been made to isolate factors that seem particularly important to society. Such factors sometimes lend themselves readily to statistical treatment and sometimes not. In any case, real problems exist in judging social adequacy.

The dates of studies are also important to consider, for over a period of time the changing nature of our society—especially improvements in such areas as record keeping, crime enforcement, reporting of violations, and the wider use of psychometric devices—would have some effect on the results. It is questionable whether results of studies made 20 years ago are applicable today.

Some studies use as a criterion of social adjustment whether the person has been brought before court or has had any trouble with the law. Such evidence may be symptomatic of social adjustment difficulties, but perhaps in too isolated a sphere. Besides the somewhat negative approach of considering how many illegitimate children the retarded have had, how many laws they have broken, etc., it is of interest to know how well-adjusted retardates are getting along—what they do with their spare time, and what satisfactions they can get in society.

In 1956 and 1957, Collmann and Newlyn (20) made a rather thorough study of leisure-time activities of subjects chosen at random from the mentally normal, dull, and subnormal groups they studied earlier. They found few differences in leisure-time preferences. Only 22% of the educationally subnormal group said they had no interest in sports. The group named football and cycling as their first preferences in sports. These sports were also popular with the other groups, although their first preference was swimming. Concerning hobbies, 12% of the subnormal group said they had none, compared with 8% of the dull group and 4% of the normal. Sixty per cent of the subnormal said they enjoyed "music, concerts, and radio," compared with 48% of the other two groups. Forty-eight per cent of the subnormal group said they enjoyed reading, although they did not say how much reading they actually did. Of the dull group, 44% said they enjoyed reading, as did 72% of the normal group. Fifty per cent of the subnormal group had voted. The study points out that in local elections, the only type in which subjects had a chance to vote because of their age at the time of the study, the proportion of eligible voters actually voting is seldom above 50%.

In the Bobroff study (11), 1953, former special class students ($N = 156$) were asked about their interest in sports, hobbies, and social activities. Thirty-two per cent said they had no interest in sports. The rest expressed these interests as their first preference of a listed group: outdoor-wildlife, 26%; outdoor-summer, -fall, 21%; indoor, 18%; all sports, 2%; and outdoor-winter, 1%. Since the subjects gave only their first preference, one cannot determine how diverse their interests in sports might have been or compare their interests with those of Collmann and Newlyn's group. It was also found that 60% expressed no interest in hobbies. Of certain other activities investigated, the following preferences were found: observational activities, 37%; travel, 32%; television or movies, 21%; and parks or lakes, 10%.

Investigating social activities, Bobroff found that 86% participated in family gatherings; 74% had close friendships; 57% attended parties; 51% attended dances; and 35% attended organizational activities. Unfortunately, no control group was used as to make possible comparisons with normal interests, but it seems likely that the social-mindedness of this group was not greatly different from that of the general population.

Bobroff also investigated the group's voting record. He found that 64% had voted at one time or another. This percentage probably compares favorably with that for the general young adult population.

In 1946, Johnson (43) investigated the activities of 243 retardates discharged from the Laconia State School, New Hampshire, between 1924 and 1934. The study shows that of the 112 females, 52 were considered socially adjusted. Of the 96 males, the number of socially adjusted was 64. Unfortunately, no criterion for adjustment was given.

Baller (5), whose study was described in the preceding section, studied the marriage rate of the retarded. In 1935 he found that, at a mean CA of about 27, 33% of his retarded males and 59% of his retarded females were married, compared with 52% and 59% of males and females, respectively, in the control group. The two groups, then, showed no difference in the percentage of females married, although there were considerably fewer retarded males who were married.

Charles (17) was later able to contact 151 of the original 196 retardates investigated by Baller. His study, reported in 1953, shows that 80% of the retarded group were married (mean CA 42). Unfortunately, he could not contact the control group. The retardates then married had an average of 2.03 children. The children's average IQ was 95.

In her 1948 study of 256 morons and 129 normal persons, Kennedy (46) found that the two groups marry at approximately the same age and have the same number of children. However, she found that significantly more marriages of the morons were terminated ($p < .05$). She also found that the moron group was lower ($p < .05$) in: (a) regular movie attendance, (b) regular sports activity, (c) regular dancing, (d) regular newspaper reading, (e) regular magazine reading, (f) regular book reading, (g) voting, (h) military service, and (i) military rank, if in service. This information gives a less optimistic impression than that of the Collmann and Newlyn study. The groups in the two studies appear about equal in intelligence test results, although no report is given of tests used. The differences may have resulted from the different cultural settings in which the studies were done.

It is often said that the retarded person is more likely to get into trouble with the law. Some say the retarded are more suggestible; they follow group leaders and are not smart enough not to get caught. Others suggest they are often unable to see alternative ways of attaining their goals and therefore often choose the most direct method, which may be illegal. It is likely that they become involved in types of illegal activities different from those of more intelligent members of society.

Baller (5) found that the retarded group he studied had records of offenses about five times greater than his normal control group. He considered only "relatively serious offenses"; traffic offenses and disturbing the peace were not included. In his follow-up of Baller's study, Charles (17) found that 40% of the group he could contact had a record of some kind of law violation.

Kennedy (46) found that 66.3% of her moron group ($N = 256$) had court records. Of her control group, 44.8% had court records. The percentage for the normal group may seem quite high, but controls were matched on some of the important variables—CA, sex, nationality, and residence in a Connecticut city—and, in determining the percentages, presumably the same investigation methods were used. The percentages suggest that the moron group did have a somewhat higher court rate.

Bronner (12) reports a follow-up study of 50 defectives and 50 normal persons brought to the Judge Baker Guidance Center in Boston. All were in court for larceny. Some were recidivists; some were first offenders. The study was made when all subjects were at least 18 years old and had been known to the center at least four years. The study shows that, of the recidivist group, 16% of the normals and 26% of the defectives were successful; i.e., had worked regularly and had not caused any trouble since the original study. Of first offenders, 54% of the normals and 39% of the defectives were successful. Bronner did not say how these groups had been treated.

Bronner (12) reports another follow-up study of 500 delinquents. Nineteen per cent were defective. Of the normal subjects dealt with on probation, 44% had a successful outcome, compared with 40% of the defectives. She concludes that the defective does stand a chance of becoming "no burden" to the community, and, like the normal person, he has the best chance for successful treatment as a first offender.

Carriker (16) compared post-school adjustments of 98 retardates who had attended special classes and regular classes in Nebraska public schools. Although the special-class students had more referrals to juvenile courts while in school, after they had left they had no more law violations than members of the other group.

On the basis of the literature, it would appear that the crime rate for the educable retarded is somewhat higher than that for normal persons. Kennedy (46) and Baller (5) present the most convincing evidence of this. Although various explanations of this difference have been attempted, it is beyond the purpose of this paper to review them in detail.

CHAPTER 2

Factors Related to Adjustment

Predicting future behavior implies assessing behavior at one point in time. From this assessment, the investigator must indicate criteria that seem to differentiate groups at some later time. He can best develop predictive instruments by using the time sequence Anderson (2) points out in his discussion of research methods:

"More significant generalizations can be made if the separations are made early and children are followed than if the scientist separates his group in the basis of adult performance and works backward, only to find his results complicated by selective factors that are difficult to interpret. In this approach, the individual becomes the independent variable, and his accomplishments, or the psychological environment he constructs for himself, the dependent variable" (p. 5).

One difficult problem in prediction is deciding what factors to consider and how general they should be. For instance, as a factor one could use rating scales of social adjustment before institutionalization, as judged by a social worker, or a large number of isolated items, such as law violation, truancy, etc. As the factor becomes more general, however, it often becomes less precise. Also, the study may become difficult to compare with others and to replicate. A testing instrument with known reliability and validity helps overcome this problem of lack of precision in a general factor.

To learn about the present status of vocational training of retardates in state institutions, Goldberg (33) wrote to 93 institutions for the retarded as listed in the 1954 directory of the AAMD. Two questions he asked are of particular importance here: "Is there any follow-up of your discharged patients as to their vocational success or failure?" and "If you have statistics available which relate to this item, please include them." Goldberg received replies from 60 of the 93 institutions. Only 15 said they had follow-up information. Some representative comments include: "About two thirds of those placed will make it on either the first or second trial"; "90% doing well"; "about 85% are successful."

It is unfortunate these institutions could not state accurately which factors seem to discriminate between successful and unsuccessful dischargees. The decision to release a patient is based on some criteria, and these must be specified and tested empirically.

Shafter (71) helped specify existing criteria by querying 91 public institutions. He received replies from 68. Fifteen respondents said they had no placement program. Replies from six others were discarded because of ambiguity: e.g., "consider all the facts." The remaining 47 considered 248 criteria in selecting patients for vocational placement. Shafter grouped them into these categories: (a) IQ, (b) good behavior in institution, (c) personality, (d) age, (e) received all institution can give, (f) do job, (g) emotionally stable, (h) good physical condition, (i) education, (j) proper attitude, (k) sterilized, (l) proper use of spare time, (m) past history, (n) truthfulness, (o) personal appearance, (p) interests, (q) no sex deviate, (r) length of residence, (s) formerly institutionalized.

Using the records of Woodward State Hospital and School, Shafter (72) later selected 205 subjects for a follow-up study. Of these, 39 were successfully placed males; 72, successfully placed females; 36, unsuccessfully placed males; and 58, unsuccessfully placed females. His criterion for success was complete discharge from the hospital. He selected each subject on the following basis: (a) patient at Woodward, (b) MD but not epileptic, (c) placed on a job according to the hospital system (social service investigation and conferences of staff), and, if the subject had failed, (d) failure through his own fault, not sickness or other factors he could not control.

For statistical testing, he then tried to objectify a list of release characteristics gathered from the 47 institutional responses and a review of literature on retardates. He ended with 56 usable characteristics. Using information from the ward records, psychometric data, and social histories from county welfare boards, he analyzed the characteristics with the *chi*-square technique and analysis of variance. His results will be considered in the discussions that follow.

Usually considered in determining differences between the successful and unsuccessful is intelligence, as determined by tests. In a follow-up study of 206 special class students, CA at least 21, Baller (5) found that IQ seems to relate to future adjustment. He compared 48 of his best-adjusted men, who were wholly self-supporting and had no record of breaking the law or "violations of accepted standards of ethics," with the rest of his male subjects. He found a statistically significant difference in IQ between the groups. The mean IQ for the successful group was 64.55; for the unsuccessful group, 59.84. He observed no IQ difference between successful and unsuccessful women.

Phelps (63) found that IQ above median ($p<.10$) was related to earning power. Studying 67 male retardates from state approved special classes (median IQ 60.6), he also found these other factors related to receiving wages above the median: (a) retardate had union membership ($p<.01$); (b) employer rated him "able to do his share of work well" ($p<.01$); (c) employer had "more jobs for one of his ability" ($p<.01$); (d) last special class teacher rated him good in "social acceptability" ($p<.05$); (e) employer said subject would "advance through seniority" ($p<.05$); (f) teacher said he had "ability to do his share" ($p<.10$); (g) employer rated him "superior in general quality of work" ($p<.10$); and (h) employer said he had "good general appearance" ($p<.10$).

Abel's study (1), reported in 1940, also relates IQ to vocational success. She studied 84 girls who had attended a trade school for girls unable to complete elementary school. The school was somewhat selective in placement: girls could attend only if they proved satisfactory during a trial period of several weeks. Abel's subjects had left the school at age 17. Abel divided them into three groups according to adjustment: "successful," "partially successful," and "failure." She conducted three follow-up studies at three different times, the first when the girls had been out of class 4 to 18 months. At the time of the third, a girl was rated successful if she had worked regularly 8 months and had earned at least 25 cents an hour, then the minimum wage. To be a partial success, she had to have worked steadily 1 to 5 months at 25 cents per hour, or a longer time at lower pay. The rest were rated failures.

Using the Otis IQ, Abel then divided the girls into an IQ 70 to 91 group and an IQ 45 to 69 group. Of the higher IQ group, 64% were classified successful, compared with 43% of the lower group. Only 8% of the brighter group had been termed complete failures, compared with 33% of the lower group. Using a *chi*-square test, Abel found a significant difference between proportions represented ($.01 < p < .02$).

Although no further data are presented, Abel said these other factors appeared to contribute to vocational success: (a) stable home, (b) ambition and self-respect, (c) careful placement, (d) guidance and encouragement during initial work period, and (e) luck in getting adequate initial jobs.

McIntosh (52), however, found that subjects with low IQs had a high rate of success. He studied 1,000 non-academic boys from the Jarvis Trade School in Toronto. Seven per cent had IQs below 60; most of the rest had IQs below 80. Of the lowest IQ group, 75.8% were self-supporting and 13.5% were unemployed; only 27% had worked at their jobs less than three years. Of the 56 men with the highest incomes, all had IQs over 60, but 76.8% had IQs in the 60 to 80 range.

"Once again in this study," McIntosh concludes, "it is indicated that 10 points in the intelligence scale are not so important as some other personality factors such as emotional stability and personal drive or ambition" (p. 170).

Shafter (72) also found that IQ apparently made no difference in successful or unsuccessful placement. It should be remembered, however, that his study was made on persons actually placed. Deciding whether or not to place them may have eliminated some of the lower group.

Hartzler's follow-up studies (36, 37) of girls discharged from Laurelton State Village, Pennsylvania, show a trend inconsistent with most findings. In her 1951 pilot study of 54 girls (36), the successful group had a mean IQ of 61, range 41 to 80, while the unsuccessful group had a mean IQ of 69, range 60 to 81. No significance test was made. In her 1953 study of 191 subjects (37), the mean IQ of the successful group was 64, range 47 to 80, and the mean IQ of the unsuccessful group was 67, range 49 to 84. For both studies, Hartzler identified "success" as "ability to be self-supporting and avoidance of conflict with the law."

There is little doubt that factors other than intelligence are important for successful placement. However, one reason why the IQ of Hartzler's unsuccessful girls was so high is that all dull-normal girls at Laurelton had to be discharged due to legal requirements. In Hartzler's 1953 study, 59% of the unsuccessful group were discharged because subjects were "too high grade" compared with only 33% of the successful group. Also, 47% of the successful were discharged because of satisfactory trial placement (parole), compared with only 18% of the unsuccessful.

Hartzler also found a considerable difference in delinquency backgrounds of her two groups. According to her 1953 study, 58% of the successful were "actively" delinquent before admission to Laurelton, compared with 79% of the unsuccessful. At Laurelton, 23% of the successful and 48% of the unsuccessful were actively delinquent. Even greater differences were found in the original pilot study done in 1951.

Hay and Kappenburg's (38) follow-up study of 48 patients of the Child Guidance Clinic, St. Paul and Minneapolis, states that truancy, temper tantrums, and enuresis at the time of referral to the clinic appear to have some predictive value. Social adjustment was rated from A to E. Of those reporting truancy at the time of referral ($N = 11$), 18% were in the A or B group, and 82% were in the D or E group; of those reporting temper tantrums ($N = 14$), 7% were classified A or B, and 85% D or E; of those reporting enuresis ($N = 12$), 25% were A or B, and 75% D or E.

Shafter (72) found no statistically significant difference between successful and unsuccessful subjects in number committed for sex delinquency (heterosexual), previous history of sex delinquency, or history of delinquency. However, behavior in the institution appeared to have some definite relation to future adjustment. Shafter found these items significantly related to the adjustment of either males, females, or the sexes combined: (a) behavior problem in institution, (b) escape from institution, (c) quarrelsomeness with employees, (d) quarrelsomeness with other patients, (e) fighting with other patients, (f) truthfulness, (g) ambition, (h) obedience, (i) carelessness, (j) punishment in five years prior to placement, (k) stealing, and (l) quality of work.

Bronner (12) reports a third follow-up study of subjects known to the Judge Baker Guidance Center. The sample contained 189 subjects with IQs less than 75. Subjects were considered successful if they were working regularly and had caused no trouble since the original study. These factors had *no* significant relation to success: "gross physical findings," racial background, and home conditions other than economic status (e.g., cleanliness, space, general hygienic conditions). Factors which seemed to have some relation included economic status (success increased going up the economic scale) and whether the clinic's recommendations were carried out. When they were, 77% of the group were successful, and 21% were complete failures.

Shafter's study (72) reveals that more patients who came from dependent homes were placed successfully on jobs than those who came from higher economic groups. Due to differences in sampling, however, Shafter's subjects can hardly be compared with those of the Judge Baker group. Shafter found no difference in adjustment rates of those from a rural or urban background.

Hartzler's studies (36, 37) suggest a relation between adjustment and the amount of supervision a retardate gets after leaving an institution. Hartzler found that time spent on parole helped distinguish the successful and unsuccessful, rated in terms of whether they were self-supporting and whether they had been in conflict with the law since their discharge. Of the successful group studied in 1953 (37), 64% had spent some time on parole, compared with only 34% of the unsuccessful. Further analysis showed that 47% of the successful had been discharged because of satisfactory parole, and 33% because they were "too high grade." Of the unsuccessful, 18% had been discharged because of successful parole, and 59% because they were "too high grade."

Hartzler's studies also show that, on the average, successful subjects were older at the time of admittance and time of release from Laurelton. They also spent a longer time in the institution.

Supervision, in Hartzler's study, is that given by social workers or staff members. Shafter (71) was also interested in the help and acceptance retardates get from non-professionals. He found no difference between successful and unsuccessful groups in the number of patients who received assistance and supervision from relatives (under direction of the social service department). But it is hard to generalize on the basis of an official record, since important facts may be unavailable or overlooked. Many persons help retardates without ever contacting an official agency or institutional social service department.

Abel (1) found that the guidance and encouragement a patient received during his initial work period seemed to contribute to success.

Cowan and Goldman (21) found no significant difference between successful and unsuccessful groups in school grade levels attained, although the mean for the successful group ($N = 12$) was 4.92, while the mean for the unsuccessful group ($N = 8$) was 3.00. "Success" was defined as holding a "paying position for at least 12 months."

Shafter (72) did find a significant difference between successful and unsuccessful in years of schooling. But he found no significant differences in whether subjects could read, write, or tell time or in whether they had attended special classes or an institutional school.

Baller (5) found two factors that helped determine vocational success in females. On the basis of information he gathered from the records of well-adjusted and poorly-adjusted females, he concluded that main factors of good adjustment were domestic training and personal appearance.

Bronner's study (12) of 189 subjects shows a relation between general adjustment and a record of familial mental deficiency. When both parents were non-defective, there was 60% success in adjustment; when one parent was defective, 51%; when both parents were defective, 41%.

Bronner's study also deals with judgments about personality. Subjects were rated by a psychiatrist, psychologist, and social worker on these personality assets: (a) energy output, (b) sociability, (c) emotional response, (d) emotional stability, and (e) verbalizations of ethical standards. According to the ratings, subjects with the assets were vocationally successful twice as often as subjects without.

For Fry's study (27) of work adjustment in an institution for girls, work foremen filled out a five-point rating scale on each girl's ability, attitude, and personality. The subjects' files were studied, and the girls were classified as satisfactory or unsatisfactory in work performance. Ability and attitude successfully differentiated the two groups.

Michal-Smith (53) also tried to specify the personality characteristics desirable for vocational success. As part of the study mentioned earlier, he sent lists of 38 personal characteristics to 200 personnel directors and 200 directors of institutions. The directors were asked to check the characteristics they considered important for four different occupational areas: manual, repetitive, machine operative, and social. Much overlap in ratings was found between the two groups of directors. Characteristics the personnel directors judged important are fairly consistent for all four areas: "is not easily fatigued" and "is not clumsy" were judged important for the first three areas; "shows caution and avoids danger," for the first and third. "Is not forgetful" was also judged important for the first; "performs responsible routine chores," for the second. For the fourth area, "is emotionally even tempered," "feels loyalty to company," and "is personally attractive" were ranked highest.

FitzPatrick (24) studied a male institutionalized population being trained in jobs outside an institution in England. Using ratings made by the institution's staff, he found that these factors differentiated successful and unsuccessful subjects: (a) realistic ambition, (b) self-reliance, (c) quality of work, and (d) work output.

The preceding studies consider a great variety of factors. It is hard to compare the studies, since problems exist in defining terms, and few studies consider exactly the same factors, especially those that deal with personality traits. In several studies that consider intelligence, however, it is agreed that the higher the IQ of the retardate, the better chances are for good future adjustment (**1, 5, 63**). A notable exception is Hartzler's finding (**36, 37**) that the successful had a somewhat lower average IQ, but this fact seems due to release requirements in the State of Pennsylvania.

Studies which consider academic achievement are not conclusive: Shafter (**72**) found that years of schooling differentiated the successful and unsuccessful; Cowan and Goldman (**21**) found it did not. Baller (**5**) concluded that domestic training was a main factor of good adjustment for females. Again we cannot make direct comparisons, since the type of academic training varied considerably from study to study, and its value was probably related to employment opportunities.

Other factors found related to successful job adjustment include personal appearance (**5, 63**), work attitudes (**27**), obedience (**72**), truthfulness (**72**), lack of carelessness (**72**), ability to do work (**27, 63**), quality of work (**24, 63, 72**), work output (**24**), and realistic ambition (**24**). Studies of general adjustment found significant such factors as stable home (**1**), familial mental deficiency (**12**), dependent home background (**72**), good economic status (**12**), length of time in institution (**37**), lack of delinquency during institutionalization (**36, 37**), length of time on parole (**37**), guidance and supervision (**1**), lack of stealing (**72**), and lack of truancy (**38**). These personality factors were found significant: ambition (**1, 72**), self-respect (**1**), emotional stability (**12**), emotional response (**12**), ability to verbalize ethical standards (**12**), lack of quarrelsomeness (**72**), lack of temper tantrums (**38**), lack of enuresis (**38**), sociability (**12**), and social acceptability (**63**).

The problem of definition and measurement is particularly acute in the last area, personality. However, most studies agree that this is the most important area to study; that is, one's adjustment is determined not so much by intelligence, although that is a factor, as by the use to which that intelligence is put. Also important is how fellow workers and community members perceive the retarded person. Although personality is hard to deal with, it is apparently important to include it in predictive instruments. Efforts must be made to objectify certain facets of personality—not to exclude them.

Prediction

For more than 20 years, investigators have been trying to predict social behavior. This section is devoted to a review of investigations which have shown prediction's theoretical and practical possibilities.

Generally, predictive studies may be classified in three ways: by subject matter of the study, content of the factors used for prediction, and method of scoring and selecting the factors. In this section, however, studies are arranged chronologically, since each has been based somewhat on earlier investigations.

In one early study, Burgess (13) used 21 pre-parole items to predict the success of 3,000 parolees. The items included ethnic origin, criminal record, conditions pertaining to trial, social type, age, etc. On the basis of information on parolees' records, Burgess divided each item into subcategories. He then computed an overall percentage violation rate for the institution and a violation rate for each subcategory.

Burgess gave one point to each parole candidate who fell in a category with a violation rate below the overall. It was possible to receive 21 points.

Burgess' method was criticized because it used only official records, was confined to conduct during the parole period, gave equal weight to all items in the scoring, used no measure of reliability or consistency of data, and used some subjective subclasses that overlapped with others.

The Gluecks (30) took these criticisms into account in their study of criminals that appeared shortly afterwards. From official records and interviews with interested persons, they selected items through use of the coefficient of the mean square contingency, a method that enabled them to learn the degree to which any item was related to behavior. This method reduced the number of items necessary to predict parole outcome; in all, the Gluecks used six. Scores were obtained by adding the percentage value of the failure rate found for each subcategory applicable to an individual.

Broadly speaking, from these studies two methods of relating background characteristics of an offender have developed; i.e., the Burgess method, of many and unweighted items, and the Glueck method, of few and weighted items. Vold (79) tested both methods and obtained a correlation of +0.922 between scores derived through their use. Monachesi (55), in a similar test, concluded that the Burgess method was more satisfactory because it discriminated more sharply between classes at the lower end of the scoring scale.

In 1934, the Gluecks (31) modified their method by selecting any item in which it was found that the maximum percentage difference of the subcategories was greater than one-half the overall violation rate. This method is simpler than figuring the coefficient of mean square contingency, and it retains the advantages of the weighted score. In a sample test of 597 cases (80), it was found that the Burgess and Glueck methods produced similar results.

Until 1936, all students in the field had relied primarily on pre-institutional admittance factors to make up the bulk of their prediction items. Laune (49) attacked this approach as unrealistic. He said the purpose of the penal institution is reform and rehabilitation, effected through a transformation of the prisoner's attitude; pre-institutional criteria cannot accurately predict his adjustment outside the institution.

Laune's work helped open the way for use of dynamic items in predictive scales. Burgess and Cottrell (14) established a marriage adjustment questionnaire that was developed out of the relation between happiness rating scales and background social factors. From this they established a table of scores to predict a couple's degree of marital adjustment.

In 1939, Baylor and Monachesi (7) used six factors to predict success in foster-home placement for children. These factors were nativity of the father and the child's interests, problems, habits, age, and attitude toward education. They used the Glueck method of selecting factors and obtained scores by adding the unfavorable percentage for each subclassification.

Using both the Burgess and the Glueck method, Weeks (84) tried to predict juvenile delinquency. In the latter method, the weight of each factor distinguishing the delinquent and non-delinquent was determined by the value of the critical ratio that gave the significance of the difference between delinquents and non-delinquents. Weeks used 14 characteristics as predictive items.

Jenkins et al (42), without giving Laune credit, also spoke of the need to inject dynamic items into the prediction instrument. In a study of well-adjusted parolees, about half their prediction items were static, and half dynamic. Items were weighted from a plus four to a minus four, although investigators did not say how weights were determined. They did say the study was designed to explore possibilities, not provide a useful prediction instrument.

Glass' study (29) of combat effectiveness relied almost entirely on dynamic data, part of which can be secured only by direct questioning. Five predictive factors were used: (a) disease and illness, (b) adult neurotic manifestations, (c) degree of insecurity, (d) family history (neuroticism and disharmony), and (e) childhood neurotic traits. This was the only study designed so that all items could be completed by direct questioning.

The Gluecks' (32) latest attempt at prediction has been in the field of juvenile delinquency. They used a sample of delinquent and non-delinquent males matched on intelligence, ethnic origin, and neighborhood. They investigated character traits on the basis of the Rorschach and personality traits on the basis of psychiatric interviews. They obtained weighed scores by using the percentage failure of each subcategory.

The latest study in predicting recidivism, and one of the best, is that of Ohlin (60). He patterned his investigation after Burgess' early work. He used 12 items, selected on the basis of four tests and scored plus one, minus one, or zero. The first test pertains to the reliability of the classifications in each subclass. The second involves the determination of the statistical significance of each subclass. The third relates to the determination of the degree of association between the subclass and parole violation, and the fourth is a measure of predictive efficiency of the subclasses.

As noted at the beginning of this section, prediction methods can be classified in three ways: by content of items, subject matter, and statistical method. Generally, items may be static or dynamic. Most prediction studies have used static information, although emphasis appears to be shifting toward the use of dynamic, when available. Reckless (64) believes investigators will rely more and more on dynamic data, but adds that "there is no reason" to neglect use of static items. He says, "Improvements in standardizing the reporting of objective information on agency records will undoubtedly have great repercussions for prediction studies as well as will the inclusion of new objective items of information in record coverage which are found to have predictive value" (p. 477).

In preparing prediction tables, items are either assigned equal weight or given varying weights depending on their importance. Experience has shown that both methods give about the same results. The method of selecting specific items has not been resolved and apparently will not be for some time.

There is now no one test or combination of tests generally accepted by workers in the field.

WISC

The Wechsler Intelligence Scale for Children (WISC) was administered to all 331 subjects in the comparative study. This section will review literature on WISC research. The review will consider only some of the more representative studies on "normal" individuals; it will consider more thoroughly the studies on retardates. For a comprehensive summary of studies on the WISC, readers are referred to the recent review by Littell (**50**).

The WISC is described in the WISC manual (**83**), which also contains much standardization data. Articles by Seashore, Doppelt, and Wesman (**69, 70**) analyze the standardization group and the performance of its subgroups. Seashore's article (**69**) considers differences in verbal and performance scales for the total group and subgroups.

In 1950, Seashore et al (**70**) computed reliability coefficients for age levels of the WISC standardization group. They used the split-half correlation technique and considered three CA levels—7-6, 10-6, and 13-6. They obtained the highest correlations when using WISC Full-Scale (FS) IQs: coefficients were .92, .95, and .94, for the three age levels, respectively. Using Verbal-Scale (VS) IQs, they obtained coefficients of .88, .96, and .96; using Performance-Scale (PS) IQs, coefficients of .86, .89, and .90.

Many investigators have tested the validity of the WISC by comparing its IQ scores with those of the Stanford-Binet. Correlation coefficients are usually high, although they vary with the type and age of subjects tested. Coefficients obtained with FS IQs are generally highest; those obtained with PS IQs are generally lowest.

Krugman et al (**48**) found that correlations between Binet and WISC VS IQs tended to increase with his subjects' age (CA 5-5 to 15-5). Correlations using FS and PS IQs seemed to decrease with the subjects' age.

Gehman and Matyas (**28**) found that correlations did not change with age. Using the Stanford-Binet and the three WISC scales, they retested 60 subjects (mean CA 15-11) who had been tested originally at mean CA 11-1. They found no significant differences between Stanford-Binet and WISC scores at either age level. They also found no significant differences in correlations between original and retest IQs obtained with the same instrument. These correlations were: Stanford-Binet, .78; WISC FS, .77; WISC VS, .77; and WISC PS, .74.

It is generally agreed that Stanford-Binet IQs tend to be higher than those obtained with the WISC. Krugman et al (**48**) found that Binet IQs were significantly higher ($p<.01$) than WISC FS IQs at all age levels except CA 14 to 15, where probabilities were between .05 and .10. The average difference for the total group was 7.22 points ($p<.01$). Investigators also found Binet IQs higher than WISC VS and PS IQs, although the difference between Binet and VS IQs did not reach significance at all CA levels. Verbal IQs were most similar to those of the Binet.

Mussen et al (**57**) also reported that Binet IQs were significantly higher than all three WISC scale means. Cohen and Collier (**18**) and Harlow et al

(35) agreed, although they did not say whether differences were significant. Holland (40) and Frandsen and Higginson (26) found no significant difference in mean IQs.

Pastovic and Guthrie (62) tested 50 children at CA 5-6 and 50 at CA 7-6. They found not only that Binet scores were higher, but that there was a greater discrepancy between scores at the lower age. It was suggested that WISC and Stanford-Binet IQs are not comparable below CA 10. Other investigators have made the same suggestion.

Studying a remedial reading group ($N = 90$), Smith and Fillmore (74) computed correlations between scores on the WISC and Ammons Full-Range Picture Vocabulary Test. The FS correlation was .75; the VS, .73; and the PS, .54. Mussen et al (57) found that both the Stanford-Binet and the WISC were good predictors of performance on the Stanford and Metropolitan achievement tests, and that both were highly related to teachers' ratings of intelligence as determined by the Haggerty-Olson-Wickman Rating Scale.

Stroud et al (76) administered the WISC and the Iowa Test of Basic Skills to 775 children in grades 3 through 6, all of whom had been identified as having some type of school disability. Stanford-Binet IQs were available for 621 pupils. Within grades, correlations were computed between the Binet and the Iowa test scales and between scales of the Iowa test and the WISC. The WISC FS IQ correlated more highly than the Binet IQ with Iowa test scores.

Frandsen and Higginson (26) tested 54 fourth-grade children with the Binet, WISC, and Stanford Achievement Test. They obtained correlations between WISC and achievement subtests and between achievement subtests and the Stanford-Binet. WISC FS correlations were higher than Binet correlations for subtests on arithmetic (.64, Binet .48), literature (.75, Binet .47), social studies (.71, Binet .61), and spelling (.55, Binet .45). The Stanford-Binet correlation was higher for the subtest on language (.64, WISC .55). WISC and Binet correlations were about equal for subtests on reading (WISC .68, Binet .67) and science (Binet .46, WISC .45).

The WISC is standardized so that the difference between average VS and PS IQs is zero, for all ages. For the standardization group, Seashore (69) reports that the standard deviation of the difference scores was 12.5. Data for three age groups (CA 5-7, 8-11, and 12-5) were analyzed, and approximately equal percentages of subjects in each group were found to have VS IQs greater than PS IQs (V>P) and PS IQs greater than VS IQs (P>V). The median value of absolute differences between PS and VS scores was approximately 8. Urban children were slightly better represented in the V>P group, and rural children, in the P>V group. When subjects were classified according to parental occupation, 62% of the children of professional or semi-professional workers had V>P.

When Gehman and Matyas (28) had retested their subjects, they found that WISC PS IQs were significantly higher than VS IQs. They had observed no significant differences in WISC scale means after the first testing. At the two age levels, correlations between the Binet and the WISC scales were not significantly different.

WISC Research on Retardates

Much of the testing research on retardates has been done with the Stanford-Binet. Since the WISC is relatively new, it is interesting to consider its relation to the Binet at lower IQ levels. Several investigators have done this.

Nale (58) obtained a correlation of .91 between Binet and WISC FS IQs of 104 retarded children (CA 8-10 to 15-11) at the Polk State School, Pennsylvania. Between Binet and WISC FS IQs of 90 institutionalized children (CA 10 to 16), Sandercock and Butler (67) obtained a correlation of .76. The VS correlation for this last group was .80; the PS correlation, .66. Binet IQs ranged from 45 to 86; the mean IQ was 58.5.

Stacey and Levin (75) divided 70 children from a state school into two groups—44 "morons" with WISC IQs between 50 and 69 and 26 persons with "borderline intelligence" and WISC IQs between 70 and 81. Binet-WISC FS correlations were .60 for the moron group and .44 for the borderline group. The correlation for the groups combined was .68.

Sloan and Schneider (73) tested 20 boys and 20 girls (CA 9-1 to 15-5) with the WISC, Stanford-Binet, and Arthur Performance Scale. All subjects were classified as familial or undifferentiated high-grade mental defectives. Correlations obtained were: Binet-WISC FS, .76; Binet-WISC VS, .75; Binet-WISC PS, .64; Arthur-WISC FS, .79; Arthur-WISC VS, .47; and Arthur-WISC PS, .83. The correlation between the Arthur and the Stanford-Binet was .60. Of all three tests, the Stanford-Binet gave the lowest mean score.

According to examples in this report, correlations between the WISC and Stanford-Binet appear somewhat lower for retardates than for normal populations. The reason may lie in the relative homogeneity of the retarded population.

Included in the WISC standardization group were 55 feeble-minded children. According to Seashore (69), 22 had V>P, 30 had P>V, and only 3 had V=P. Seashore concluded, "Apparently we would be unsafe in accepting as clinically important the somewhat common generalization that the feeble minded in this age range are less feeble minded on performance tests" (p. 66).

Results of other studies do not fully agree with this statement. Atchison (4) found that VS IQs were significantly higher than PS IQs. Testing 80 Negro retardates, none of whom were identified as having brain damage, he obtained a mean VS IQ of 66.3 and a mean PS IQ of 56.8.

Stacey and Levin (75) found that 81% of their borderline group had P>V. Of the morons they studied, equal percentages had P>V and V>P. Of the groups combined 61% had P>V.

Sloan and Schneider (73) and Newman and Loos (59) found that PS IQs were significantly higher than VS IQs for all subjects except those having brain damage. Sloan and Schneider studied 40 retardates classified as familial or undifferentiated high-grade defectives. Newman and Loos studied 231 retardates (FS IQ>50)—128 familial, 75 undifferentiated, and 28 brain-damaged. The four investigators found that the familial and undifferentiated subjects had P>V. Newman and Loos found a mean difference of 8.1 for the familial and 4.8 for the undifferentiated. No significant differences were found between VS and PS IQs for the brain-damaged group. Yet, on the average, the brain-damaged scored higher on the Verbal Scale and lower on the Performance Scale than the undifferentiated retardates.

Baroff's report (6) on 53 familial and undifferentiated retardates states that the mean PS IQ for the group was 68.9, and the mean VS IQ was 63.3. The difference was not significant. Seventy-nine per cent had P>V. Scores indicated that the Object Assembly subtest was easiest, and the Similarities subtest was hardest.

Chapter 3

A Zero-Order Prediction Study of Retardates

THE OWATONNA STATE SCHOOL DISCHARGEES

In July, 1945, a residential school for educable retarded children was established on the campus of a former state orphanage at Owatonna, Minnesota. The children who may attend, their length of stay, and the kind of education they receive is described in the pamphlet, *Owatonna State School—Some Questions and Answers* (**61**):

> 1. Who may attend the Owatonna State School?
>
> Children eight years and older who are legal residents of Minnesota. They must be legally committed as mentally deficient and able to profit by the type of training given. The training is geared to the needs of retarded children who are considered capable of some degree of self-support. The decision to accept a child is made after a careful study of his mental, physical and social characteristics.
>
> 2. How long do these children stay at Owatonna?
>
> They may stay until they are twenty-one but may leave earlier if the staff thinks they are ready for life in the community.
>
> 3. What do they learn?
>
> We try to teach them good work habits and as much regular school work as they can learn. Since they are all slow learners very few will get beyond the fifth grade and most of them will be below that. The school department has twenty-four teachers who teach academic work, craft skills and physical education.
>
> The children also learn in the work-training program when they are given jobs to do in the cottages, bakery, farm, laundry, carpenter shop, kitchen, dining room and other areas.

Through January, 1955, 500 persons had been discharged from Owatonna since its establishment. In July, 1957, 161 of these persons (32%) were living in the community, under supervision of county welfare boards; 183 (37%) were in institutions throughout the state; 65 (13%) had been discharged from guardianship; and 91 (18%) had moved out of the state or were "lost" for other reasons. Of the 91, nine were dead, six were in the armed forces, and seven had had their commitments declared null and void. No further mention will be made of these 91 cases; data on the 409 persons, however, will be examined intensively.

Ability to obtain information for the predictive study was dependent on the nature of Minnesota's guardianship plan for the mentally deficient (**54**). In Minnesota, the mentally deficient are committed to guardianship of the state commissioner of public welfare. This commitment lasts for life, unless a patient is discharged through court action.[2] The commissioner delegates his authority to welfare boards in Minnesota's 87 counties, through the State Department of Public Welfare, Section for Mentally Deficient and Epileptic. Information, therefore, was available on state, county, and institutional levels.

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[2] Such action indicates that the person no longer needs the supervision guardianship provides. All such dischargees are in the community; i.e., none are institutionalized.

Biographical data sheets were completed for all 400 subjects (for directions, form, and definitions, see Exhibits A through C, Appendix A). In general, each sheet contained the kind of information available when institutional placement of each child was considered. Items were: (a) sex, (b) type of home community, (c) number of home situations experienced, (d) county of settlement at commitment, (e) indication of familial mental retardation, (f) presence of a physical defect, (g) record of delinquency before institutionalization, (h) prior institutionalization, (i) IQ at admittance to Owatonna, (j) age at admittance, (k) length of stay, (l) age at discharge, and (m) age and residence at time of the follow-up study. For those living in the community under supervision, the county of residence was also recorded.

Further information was obtained from a questionnaire designed to investigate as many important facets of adjustment as possible. Two forms were used: one for institutionalized wards and another for wards living in the community under supervision (see Exhibits D through G, Appendix A). Questions covered these general areas: (a) marital status; (b) capacity for economic self-sufficiency; (c) ability to manage funds; (d) ability to form social relationships; (e) cooperation with institutional or welfare board personnel; (f) quality of supervision of wards in the community by non-professionals other than employers; (g) amount of supervision required for institutionalized wards; (h) mental and physical condition; (i) personal hygiene habits; (j) frequency of law violation; (k) frequency of escape from institution; (l) sexual adjustment; and (m) quality of overall adjustment. Questionnaires were not completed for wards discharged from guardianship, but for parts of the analysis their overall adjustment was considered most desirable.

Questionnaires were completed by caseworkers with direct and continuing responsibility for each subject. Questionnaires for wards in the community were mailed by the Department of Public Welfare to all county welfare boards. Those for institutionalized wards were completed by social service staff members. All questionnaires were completed during July and August, 1957.

POST-INSTITUTIONAL STATUS

Table 1 of this report summarizes responses to certain items on the biographical data sheet: sex, home community, home situations, county of settlement, familial deficiency, physical disability, delinquent behavior, and prior institutionalization (for *chi*-square tests of significance, see Table 56, Appendix B). Subjects are grouped according to follow-up status, and percentages are given for the proportion of each group with each characteristic listed.

Of items in Table 1, only physical disability seemed definitely related to follow-up status. Six of every 10 subjects had some physical defect at the time of commitment. The percentage for each group differed significantly from the percentage for all subjects combined. Of the discharged group, 43% had a physical defect; of the community group, 54%; and of the institutionalized group, 72%. Many subjects had more than one defect, but the number of combinations was too great to permit a meaningful summary. Whether a subject had more than one defect was not further considered.

The three groups differed significantly from one another in number of home situations, apparently because percentages for the discharged group differed so much from the total percentages. However, when the discharged and community groups were considered together, home situations had no meaningful relation to follow-up status.

Many studies have shown evidence that familial deficiency is related to follow-up status; this study does not demonstrate the relation statistically. Also, investigators found no significant relation between status and prior institutionalization, although the discharged group contained the lowest pro-

TABLE 1

Summary of Categorical Characteristics of Dischargees by Follow-up Status

Characteristic	Follow-up Status: Discharged (N = 65)	Community (N = 161)	Institutionalized (N = 183)	Total (N = 409)
	per cent	per cent	per cent	per cent
Sex				
Males	49.2	60.2	60.7	58.7
Females	50.8	39.8	39.3	41.3
Home community				
Rural	18.5	32.3	28.9	28.6
Town	43.1	32.3	32.8	34.2
City[a]	38.4	35.4	38.3	37.2
Home situations				
One	21.5	44.7	35.0	36.7
Two	21.5	19.9	28.4	24.0
Three	27.7	13.0	14.7	16.1
Four or more	29.3	22.4	21.9	23.2
County of settlement				
Hennepin or Ramsey[b]	33.8	36.6	35.0	35.5
Other counties	66.2	63.4	65.0	64.5
Familial deficiency				
Yes	78.5	77.0	65.6	72.1
No	21.5	23.0	34.4	27.9
Physical disability				
Yes	43.1	54.0	72.1	60.4
No	56.9	46.0	27.9	39.6
Delinquent behavior				
Yes	36.9	28.6	25.1	28.4
No	63.1	71.4	74.9	71.6
Prior institutionalization				
Yes	35.4	41.6	52.5	45.5
No	64.6	58.4	47.5	54.5

[a] Includes only Minneapolis, St. Paul, and Duluth, Minnesota's three largest communities.

[b] Minnesota's two most populous counties, which constitute the Minneapolis-St. Paul metropolitan area.

portion of previously institutionalized subjects (35%), and the institutionalized group contained the highest (52%).

Table 2 deals with quantitative information from the data sheets: IQ and age at admittance to Owatonna, length of stay, and ages at the time of discharge and the follow-up study. The table contains mean statistics for each status group and standard deviations and variance ratio values for comparing differences in group means. The groups differed significantly in admittance IQ, admittance age, and discharge age. The discharged group (mean IQ 65) had a higher admittance IQ than the community group (mean IQ 61), which in turn had a higher IQ than the institutionalized group (mean IQ 57). The mean admittance age for the institutionalized group was 13.9 years; for the community group, 14.8 years; and for the discharged group, 15.1 years. Institutionalized subjects were also significantly younger at discharge (mean CA 17.3) than those discharged from guardianship (CA 18.7) or in the community (CA 18.8).

TABLE 2

Means, Standard Deviations, and Analysis of Variance Results for Comparison of Quantitative Characteristics of Dischargees by Follow-up Status

Characteristic	Follow-up Status: Discharged ($N = 65$)	Community ($N = 181$)	Institutionalized ($N = 163$)	Total ($N = 409$)	F*
Admittance IQ					
M	65.1	61.0	56.8	59.8	27.281*
SD	7.5	7.6	6.9	8.8	
Admittance age (years)					
M	15.1	14.8	13.9	14.4	6.043*
SD	2.9	2.3	3.2	2.9	
Years at Owatonna					
M	3.7	4.0	3.4	3.7	4.347
SD	1.8	2.1	2.1	2.1	
Discharge age (years)					
M	18.7	18.8	17.3	18.1	13.402*
SD	2.9	2.3	3.1	2.9	
Follow-up age (years)					
M	25.8	25.3	24.6	25.1	3.201
SD	3.9	3.1	3.9	3.8	

* Degrees of freedom are $n_1 = 2$ and $n_2 = 406$. Asterisk (*) indicates a significant difference in mean values at a probability of .01 or less.

Quality of Adjustment

Both forms of the follow-up questionnaire included a total adjustment item. On the community form, four ratings were possible: good, fair, marginal, and poor. The institutional form provided for only three: good, fair, and poor. However, so few persons, either in the community or in the institution, were rated fair, marginal, or poor that these ratings were combined into a single rating which shall be referred to hereafter as "poor" adjustment (for *chi*-square tests of significance, see Table 57, Appendix B).

Table 3 considers the subject characteristics dealt with in Table 1. Table 3, however, gives percentages of community and institutionalized subjects making good and poor adjustments. For institutionalized subjects, no differences between the good and poor groups were significant. For subjects in the community, differences were significant in only one category, delinquent behavior. Of community subjects rated poor, 40% had records of prior delinquent behavior, compared with only 21% of those rated good.

TABLE 3

Summary of Categorical Characteristics of Community and Institutionalized Dischargees by Quality of Adjustment

	Community		Institutionalized	
Characteristic	Good ($N = 99$)	Poor ($N = 62$)	Good ($N = 115$)	Poor ($N = 68$)
	per cent	per cent	per cent	per cent
Sex				
Males	59.6	61.3	63.5	55.9
Females	40.4	38.7	36.5	44.1
Home community				
Rural	32.3	32.3	33.0	22.1
Town	37.4	24.2	31.3	35.3
City[a]	30.3	43.5	35.7	42.6
Home situations				
One	45.5	43.5	33.0	38.2
Two	19.2	21.0	33.0	20.6
Three	14.1	11.3	14.8	14.7
Four or more	21.2	24.2	19.2	26.5
County of settlement				
Hennepin or Ramsey[b]	34.3	40.3	33.0	38.2
Other counties	65.7	59.7	67.0	61.8
Familial deficiency				
Yes	78.8	74.2	63.5	69.1
No	21.2	25.8	36.5	30.9
Physical disability				
Yes	55.6	51.6	73.0	70.6
No	44.4	48.4	27.0	29.4
Delinquent behavior				
Yes	21.2	40.3	22.6	29.4
No	78.8	59.7	77.4	70.6
Prior institutionalization				
Yes	44.4	37.1	54.7	48.5
No	55.6	62.9	45.3	51.5

[a] Includes only Minneapolis, St. Paul, and Duluth, Minnesota's three largest communities.

[b] Minnesota's two most populous counties, which constitute the Minneapolis-St. Paul metropolitan area.

Table 4 considers the quantitative characteristics dealt with in Table 2. It groups subjects according to adjustment and follow-up status, and it includes variance ratios for studying differences between good and poor adjustment groups. Of community subjects, those rated good had a significantly higher average discharge and follow-up age. At the time of discharge, they were a year older than those rated poor; at the time of the follow-up study, 1.6 years older. For institutionalized subjects, a significant difference was found under admittance IQ. The group rated good had an average IQ 3.7 points lower than the group rated poor.

TABLE 4

Means and Analysis of Variance Results for Quality of Adjustment Comparisons on Quantitative Characteristics of Community and Institutionalized Discharges

	Community			Institutionalized		
	Means			Means		
Characteristic	Good ($N = 90$)	Poor ($N = 62$)	F^a	Good ($N = 115$)	Poor ($N = 68$)	F^b
Admittance IQ	60.9	61.2	.045	55.4	59.1	7.660*
Admittance age (years)	15.0	14.5	1.782	14.1	13.5	1.495
Years at Owatonna	4.2	3.7	2.433	3.4	3.3	.195
Discharge age (years)	19.2	18.2	7.520*	17.6	16.8	2.740
Follow-up age (years)	25.9	24.3	11.366*	25.1	23.7	5.802

Note.—Asterisk (*) indicates a significant difference in mean values at a probability of .01 or less.

[a] Degrees of freedom are $n_1 = 1$, $n_2 = 150$.

[b] Degrees of freedom are $n_1 = 1$, $n_2 = 181$.

Components of Adjustment

Tables 5 through 7 show which items on the follow-up questionnaire were related to total adjustment and how strong the relation was. Tables 5 and 6 summarize responses to the items. Table 5 deals with responses to the community form; Table 6 deals with the institutional form. Both tables group subjects according to their total adjustment rating, good or poor. For subjects in the community, results of *chi*-square significance tests (see Table 58, Appendix B) show significant differences between good and poor adjustment groups on all but 3 of the 11 items in Table 5. These three are marital status, economic self-sufficiency, and physical handicaps affecting employment or employability. For institutionalized subjects, *chi*-square values show significant differences on all but one item, physical condition (see Table 59, Appendix B).

To demonstrate the comparative strength of relations, Table 7 reports contingency coefficients for the significant relations shown in Tables 5 and 6. These coefficients permit only a rough comparison between institutional and community subjects, since the number of subjects in each group is different, as is the number of classification categories.

TABLE 5

Response Percentages for Specific Components of Community Adjustment for Good and Poor Adjustment Groups

Item and Response	Adjustment Group Good (N = 99)	 Poor (N = 62)	 Both (N = 161)
	per cent	per cent	per cent
Social relations			
"Gets along well"	80.8	30.6	61.5
Other than above	19.2	69.4	38.5
Participation in social activities			
"Regularly"	27.1	8.2	19.8
"Occasionally"	50.0	29.5	42.0
"Almost never"	22.9	62.3	38.2
Cooperation with welfare board			
"Cooperative"	77.5	40.3	63.1
"Indifferent"	13.3	45.2	25.6
"Resistant or hostile"	9.2	14.5	11.3
Supervision (non-employment) quality			
"Good"	66.3	27.6	51.9
Not "good"	19.4	53.4	32.1
"None"	14.3	19.0	16.0
Marital status			
"Married"	21.2	24.2	22.4
Not "married"	78.8	75.8	77.6
Economic self-sufficiency			
"Fully self-supporting"	59.6	37.3	51.6
"Marginally self-supporting"	9.1	17.2	12.1
"Partially dependent"	11.1	12.1	11.5
"Fully dependent"	20.2	33.3	24.8
Ability to manage funds			
"Uses good judgment"	52.7	18.6	39.3
"Occasionally uses poor judgment"	38.5	32.2	36.0
"Usually uses poor judgment"	8.8	49.2	24.7
Physical handicaps affecting employment or employability			
"No handicap"	83.7	74.2	80.0
"Minor handicap"	10.2	14.5	11.9
"Severe handicap"	6.1	11.3	8.1
Personal hygiene			
"Usually very well-groomed"	72.4	42.6	61.0
Other responses	27.6	57.4	39.0
Law violations			
"No violations"	94.9	79.0	88.8
"One minor violation" or more	5.1	21.0	11.2
Sexual adjustment			
"No sexual adjustment problems"	98.0	81.7	91.8
Socially condemned and/or abnormal practices	2.0	18.3	8.2

TABLE 6

Response Percentages for Specific Components of Institutional Adjustment for Good and Poor Adjustment Groups

Item and Response	Adjustment Group Good (*N* = 115)	 Poor (*N* = 68)	 Both (*N* = 183)
	per cent	per cent	per cent
Relations with associates			
"Gets along well"	78.3	19.1	56.3
Other than above	21.7	80.9	43.7
Interest in social activities			
"Considerable"	56.1	30.9	46.7
"Some," "little," or "none"	43.9	69.1	53.3
Cooperation with staff			
"Cooperative"	92.2	42.6	73.8
"Indifferent," "resistant," or "hostile"	7.8	57.4	26.2
Supervision required			
"Very little"	26.9	2.9	18.0
"Some"	43.5	23.5	36.1
"Considerable"	26.1	53.0	36.1
"Complete"	3.5	20.6	9.8
Responsibility of work			
"Considerable"	27.0	7.4	19.7
"Some"	42.6	38.2	41.0
"Little"	27.0	35.3	30.0
"No work assignment"	3.4	19.1	9.3
Quality of work performance			
"Excellent," "good"	62.6	26.5	49.2
"Fair," "poor"	33.9	57.3	42.6
Does not apply	3.5	16.2	8.2
Economic prognosis			
"Completely self-sufficient"	32.2	23.5	28.9
"Partially self-sufficient"	40.9	25.0	35.0
"Completely dependent upon others"	26.9	51.5	36.1
Physical condition			
"Good"	73.0	73.5	73.2
"Fair," "poor"	27.0	26.5	26.8
Mental disturbance			
"None"	89.6	52.9	76.0
"Infrequent," "severe and chronic"	10.4	47.1	24.0
Runaway frequency			
"Frequent," "occasional"	7.8	22.1	13.1
"None"	92.2	77.9	86.9
Sexual adjustment			
"Wholesome adjustment"	93.0	73.1	85.7
Not "wholesome adjustment"	7.0	26.9	14.3

TABLE 7

Contingency Coefficients Reflecting Relations of Specific to Total Community and Institutional Adjustment

Community Adjustment Item	Contingency Coefficient	Institutional Adjustment Item	Contingency Coefficient
Social relations	.448	Relations with associates	.499
Ability to manage funds	.433	Cooperation with staff	.478
Participation in social activities	.374	Supervision required	.422
Supervision (non-employment) quality	.367	Mental disturbance	.383
		Quality of work performance	.348
Cooperation with welfare board	.363	Responsibility of work	.319
		Sexual adjustment	.265
Personal hygiene	.285	Interest in social activities	.238
Sexual adjustment	.277	Economic prognosis	.241
Law violations	.239	Runaway frequency	.200

Items from the community list may be arranged into four groups according to relatedness to total adjustment. The first group contains items most closely related, the factors county social workers use most consistently to determine adjustment. The fourth group contains items not included in Table 7 because they had no relation at all to total adjustment. As contingency coefficients indicate, in the first group are social relations and ability to manage funds. In the second are participation in social activities, supervision (non-employment) quality, and cooperation with welfare board. In the third are personal hygiene, sexual adjustment, and law violations. In the fourth are marital status, economic self-sufficiency, and physical handicaps affecting employment or employability.

Coefficients for items on the institutional list cover a wider statistical range. Items most highly related to total adjustment were relations with associates and cooperation with staff. Moderately related were supervision required, mental disturbance, quality of work performance, and responsibility of work. Slightly related were sexual adjustment, interest in social activities, economic prognosis, and runaway frequency. Not related at all was physical condition.

Too often these days retardates are grossly judged on only a specific item of adjustment. When social workers judge total adjustment, in a community or institution, they appear to rely most on the individual's ability to relate to other people. They place little or no weight on the retardate's capacity, present or future, to be economically self-sufficient.

RELIABILITY OF TOTAL ADJUSTMENT RATING

This follow-up study involved the rating of community and institutionalized subjects by many individuals. They rated subjects on total adjustment as well as specific components. Relations of the specific components to total adjustment, presented earlier, give some evidence of rater reliability.

To more fully explore the reliability factor, three social workers with different responsibilities for retardates were asked to judge total adjustment from the ratings of others on specific components. Rater A was a social worker in the State Department of Public Welfare; rater B was a supervisor of caseworkers in a unit for the mentally deficient and epileptic in one of Minnesota's two metropolitan counties; rater C was chief of social services in one of Minnesota's state schools and hospitals that cares for the mentally retarded.

Table 8 gives percentages of community and institutionalized subjects rated as making good adjustment by caseworkers and the three "blind" raters. The blind raters classified fewer subjects good than did the caseworkers, who had observed the subjects in community or institutional situations.

TABLE 8

Percentages of Community and Institutionalized Discharges Observed and Blind Rated as Making Good Adjustment

Rating	Community ($N = 161$)	Institutionalized ($N = 183$)
Observed	61.5	62.8
A	18.6	53.7
B	36.6	19.7
C	19.9	33.9

Table 9 gives contingency coefficients that represent the degree of similarity between observed and blind ratings. All coefficients are significant at the .01 level.

It is especially interesting to note that these coefficients are the same approximate size as those determining the relation between total adjustment and various components (see Table 7). This might not have occurred, in view of the low base rates of the blind raters.

TABLE 9

Contingency Coefficients for Interrelations of Observed and Blind Ratings of Community and Institutionalized Discharges

Interrelation	Community ($N = 161$)	Institutionalized ($N = 183$)
Observed vs. Rater A	.299	.430
Observed vs. Rater B	.384	.205
Observed vs. Rater C	.341	.414
Rater A vs. Rater B	.491	.360
Rater A vs. Rater C	.385	.524
Rater B vs. Rater C	.487	.417

Note.—All coefficients computed from a 2 x 2 table. All coefficients significantly different from zero at a probability of .01 or less.

CHAPTER 4

Multi-Variable Prediction of Adult Status

UTILIZATION OF STATIC FACTORS

As reported in Chapter 3, three factors were found related to the general follow-up status of Owatonna dischargees: (a) presence of a physical defect, (b) admittance IQ, and (c) admittance age. These factors are *static*: they cannot be changed with a subject's further development.

Investigators studied these factors to determine how well they could be used to predict success. For each subject, the criterion for success was discharge from guardianship at the time of the follow-up study or residence in the community under supervision. The criterion for failure was institutionalization. According to these criteria, a higher percentage of successful subjects had no physical defects, and the successful had a higher IQ and age at admittance to Owatonna.

The *phi* coefficient −0.216 represents the relation of the criterion dichotomy, *successful-unsuccessful*, to physical disability. Point-biserial correlation coefficients of +0.306 and +0.166 represent the relation of the dichotomy to admittance IQ and age, respectively. The three pre-institutional variables were not found significantly related to one another.

But since all three did relate to post-institutional success, the question arose as to whether an equation using them as independent variables could produce a dependent variable that could be used as a reliable prediction instrument.

To check efficiency of the variable that would result, subjects were divided into two samples. In proportions of each sex and adjustment category represented, each sample was approximately equal to the other and to the group of 409. The division was done by random means. Subjects were first divided into 10 groups, and their names were alphabetized. Beginning with the first person, every other subject was assigned to the first sample; all others were assigned to the second. Table 10 shows the composition, by sex and adjustment category, of the final samples.

By means of Mower's computer program (56), data were treated to a discriminate analysis that would maximize the multivariate discrimination be-

TABLE 10

Distribution of 409 Dischargees by Sex and Adjustment Category into Two Samples

	Sample 1		Sample 2	
Adjustment Category	Males	Females	Males	Females
Discharged	16	17	16	16
Community "good"	30	20	29	20
Community "poor"	19	12	19	12
Institutionalized "good"	37	21	36	21
Institutionalized "poor"	19	15	19	15
All subjects	121	85	119	84

tween successful and unsuccessful subjects. Each sample was treated separately; then the samples were combined and treated again. These three equations resulted:

Sample 1: $Y_1 = -27.30\,X_1 + 4.023\,X_2 + 0.3370\,X_3$
Sample 2: $Y_2 = -52.08\,X_1 + 3.588\,X_2 + 0.6390\,X_3$
Combined samples: $Y_T = -18.91\,X_1 + 1.920\,X_2 + 0.2458\,X_3$

X_1, either 1 or 0, represents the presence or absence of a physical defect; X_2 represents the admittance IQ; X_3, the admittance age in months.

These critical values were obtained for each equation:

$$Y_1' = 283.1$$
$$Y_2' = 288.1$$
$$Y_T' = 144.9$$

A subject could be classified successful only if actual values for Y were greater than critical ones.

Results of tests to determine the discriminating ability of these equations appear in Table 60, Appendix B. They show that the successful were significantly different from the unsuccessful, in the multivariate sense, for each sample separately and combined.

To investigate the equations' reliability, observed values of the *X*s were substituted into the equation, and values of Y_1 and Y_2 were calculated for all subjects in each sample. Table 11 contains the resulting means and standard deviations of Y_1 and Y_2. Within the sexes of Sample 1, Y_1 and Y_2 had a correlation coefficient of +0.940; within the sexes of Sample 2, a coefficient of +0.950. A coefficient of +0.945 resulted from pooling within sums of deviation squares and products for both sexes and samples.

Because this correlation indicates a high equivalent-forms reliability, investigators felt that further analysis needed to be made only with Y_T, the discriminant function for the total sample. They obtained for Y_T a mean of 145.9. The standard deviation of values was 22.29.

Table 12 summarizes the results of analysis of variance tests made to contrast the means of Y_T for various adjustment and status groups. No significant differences appeared between means for "good" and "poor" subjects, either

TABLE 11

Means and Standard Deviations of Discriminant Variables Y_1 and Y_2 by Sample

Discriminant Variable		Sample 1 ($N = 206$)	 2 ($N = 203$)	 Both ($N = 409$)
Y_1	Mean	284.76	279.82	282.31
	SD	40.98	41.60	41.29
Y_2	Mean	296.75	290.31	293.56
	SD	48.26	50.16	49.21

Note.—Degrees of freedom for standard deviations are 204, 201, and 405, since they were computed from within sex and sample data.

TABLE 12

Results of Analysis of Variance Tests for Significance of Differences among Selected Means for the Three-Variable Discriminant Function

Comparison	F[a]	Degrees of freedom n_1	Degrees of freedom n_2
Discharged-Community-Institutionalized	43.166*	2	406
Successful-Unsuccessful	71.052*	1	407
Community Good-Poor	0.006	1	159
Institutionalized Good-Poor	3.173	1	181

[a] Asterisk (*) indicates a significant differe e at a probability of .01 or less.

institutionalized or in the community. This is interesting because admittance IQ discriminated negatively between good and poor institutionalized subjects. But it is not surprising that the discriminant variable significantly differentiated the discharged, community, and institutionalized groups, since each independent variable did so separately. Mean values of Y_T were 161.3 for the discharged, 150.5 for the community, and 136.3 for the institutionalized (unsuccessful) subjects. The mean for the successful group as a whole was 153.6.

Table 13 gives percentages of subjects classified successful by the discriminant method and each of the other dichotomous methods, used singly or in combination. "Physical disability" was considered dichotomous as if all subjects without physical defects would have been successful, while all those with defects would have been unsuccessful. The other methods are

TABLE 13

Percentages of Dischargees Classified Successful by Dichotomous Methods and *Chi*-Square Tests for Symmetry of Classification for Criterion Groups

Method[a]	Rate[b]	*Chi*-Square[c]
	per cent	
Discriminant function (Y_T)	53.1	0.628
Physical disability (X[illegible])	39.6	34.675*
Admittance IQ (X[illegible])	53.1	0.567
Admittance age (X[illegible])	54.8	0.022
X[illegible] and X[illegible]	68.2	19.922*
X[illegible] and X[illegible]	70.4	24.025*
X[illegible] and X[illegible]	79.5	64.907*
X[illegible], X[illegible], and X[illegible]	48.4	5.370

[a] For single methods, the successful are those with Y_T greater than 144.9, no physical disability, admittance IQ greater than 59, or admittance age greater than 172 months. For pairwise methods, one or both methods must indicate success; for the triplet combination, two or more.

[b] To be compared with the base rate of 55.3% successful ($N = 226$).

[c] Asterisk (*) indicates a significant difference in percentages of correct classifications at a probability of .01 or less.

dichotomous because observed values were considered to lie not along a continuous scale, but below or above an established critical value. Critical values for admittance age and IQ were 172 months (14⅓ years) and 59, respectively. They were obtained for each variable by averaging the means for successful and unsuccessful groups.

Percentages of predicted success varied from 39.6%, for those with no physical defect, to 79.5%, for those with either admittance IQ and/or age above the critical values. According to the criterion for observed success, the actual proportion was 55.3% ($N = 226$).

In the right-hand column of Table 13, results of the *chi*-square analysis compare the percentage of successful correctly classified by each method with the corresponding percentage of unsuccessful. Percentages of correct classifications differed significantly when classification was by physical disability alone or any of the three pairwise methods.

The percentages correctly classified appear in Table 14, together with *phi* coefficients that show their relation to the criterion classifications. The percentages show that physical disability classified the unsuccessful better than the successful. Of the unsuccessful, 72.1% had a physical defect, while only 49.1% of the successful had none. The pairwise methods classified the successful better than the unsuccessful (for percentages of correct classifications by both variables in pairwise methods, see Table 61, Appendix B). The percentages and coefficients ordered methods about the same way in their ability to classify subjects.

On the average, the discriminant method did the best classification job. It was correct 68.5% of the time. However, some other methods classified either the successful or unsuccessful more accurately. The next best method for both groups, a combination of physical disability and admittance IQ,

TABLE 14

Percentages of Correct Classifications of Dischargees by Dichotomous Methods and *Phi* Coefficients with Criterion Classifications

Method[a]	Adjustment Group			
	Successful ($N = 226$)	Unsuccessful ($N = 183$)	Both ($N = 409$)	*Phi*[b]
	per cent	per cent	per cent	
Y_T	69.4	67.2	68.5	0.365*
X_1	49.1	72.1	59.4	0.216*
X_2	66.4	63.4	65.0	0.297*
X_3	59.3	50.8	55.5	0.101
X_1 and X_2	80.5	47.0	65.5	0.294*
X_1 and X_3	78.3	39.3	60.9	0.192*
X_2 and X_3	88.5	31.7	63.1	0.248*
X_1, X_2, and X_3	61.5	67.8	64.3	0.291*

[a] Y_T, X_1, X_2, and X_3 refer to the discriminant variable for the total group and the independent variables of physical disability, admittance IQ, and admittance age, respectively.

[b] Asterisk (*) indicates a significant relation to criterion classification at a probability of .01 or less.

was correct 65.5% of the time. The poorest method for both groups was admittance age.

EFFICACY OF DYNAMIC FACTORS

It has been felt that absence of behavior data is one shortcoming of most prediction methods. To make use of such data, investigators for this study employed an adjective checklist developed by Reynolds (65) from case records of 340 early Owatonna residents. The checklist contained 150 items. Reynolds tested it on 131 subjects discharged from Owatonna between July, 1952, and February, 1955. Of that group, 107 subjects were included in the sample of 409 used for the present study. Sixty-four of the 107 were successful; 43 were unsuccessful.

Reynolds had each subject rated by one teacher and houseparent who had been in contact with the subject during his stay at Owatonna. The raters—in all, 6 teachers and 11 houseparents—were asked to check items that seemed especially descriptive of the student.

For Reynolds' study, items were analyzed to determine the relation of each to a subject's adjustment classification. Ratings by teachers and houseparents were so similar that only teachers' ratings were used to select the most promising items for future study and development of homogeneous keys.

Items were grouped for homogeneity according to the method of Loevinger et al (51). Three categories were obtained. Fifteen items from each were selected to form three adjective scales, designated as Key 1, Key 2, and Key 3. Key 1 items are positive qualities; Key 2 items show difficulty in getting along with others; Key 3 items are symptoms of personal maladjustment.

Items in Key 1 are: (a) anxious to learn, (b) anxious to please, (c) attentive, (d) cooperative, (e) courteous, (f) gets along well with others, (g) good-natured, (h) likeable, (i) no discipline problem, (j) obedient, (k) pleasant, (l) quiet, (m) well-behaved, (n) well-liked, and (o) willing. Items in Key 2: (a) anti-social, (b) bad influence, (c) belligerent, (d) defiant, (e) destructive, (f) difficult to control, (g) disobedient, (h) hard to discipline, (i) incorrigible, (j) quarrelsome, (k) rebellious, (l) stubborn, (m) sullen, (n) temper-tantrums, and (o) untruthful. Items in Key 3: (a) annoying, (b) behavior problem, (c) bossy, (d) cannot get along with others, (e) changeable, (f) daring, (g) distractible, (h) incoherent, (i) indifferent, (j) irresponsible, (k) moody, (l) quick-tempered, (m) unable to play with others, (n) unreliable, and (o) unstable (for a copy of checklist, see Exhibit J, Appendix C).

Table 15 contains the mean number of items from each key that were checked for each subject in the present study by teachers, houseparents, and the raters combined. The table includes a total key score, the derivation of which will be described later (for standard deviations, see Table 62, Appendix B), and results of variance ratio tests to show differences between teacher and houseparent means. A significant difference existed only for items in Key 2, on which houseparent ratings were more negative.

Investigators computed correlation coefficients for teacher and houseparent ratings on each of the three keys and the total key. All coefficients were significantly different from zero at a probability of .01 or less. Values were

TABLE 15

Means of Teacher, Houseparent, and Combined Ratings on Adjective Checklist Keys for 107 Dischargees with Results of Analysis of Variance Significance Tests for Mean Differences between Teacher and Houseparent Ratings

	Rater			
Key	Teacher	Houseparent	Both	F*
Key 1	4.78	5.31	10.09	1.60
Key 2	2.60	4.38	7.08	13.78*
Key 3	3.11	3.82	6.93	4.42
Total key	58.55	57.74	116.29	0.24

* Asterisk (*) indicates a significant difference at a probability of .01 or less.

+.520 for Key 1, +.357 for Key 2, +.343 for Key 3, and +.537 for the total key. One concludes that the teacher-houseparent reliability is best for Key 1 and the total key.

Table 16 shows intercorrelations among ratings on the three keys when made by teachers, houseparents, and the combined group. All coefficients were significantly different from zero, although teacher-houseparent ratings were consistently highest.

TABLE 16

Intercorrelations among Adjective Checklist Keys for Teacher, Houseparent, and Combined Ratings of 107 Dischargees

	Rater		
Relationship	Teacher	Houseparent	Both
Key 1-Key 2	−.490*	−.655*	−.648*
Key 1-Key 3	−.633*	−.500*	−.594*
Key 2-Key 3	.657*	.783*	.798*

Note.—Degrees of freedom for each coefficient are 101, since values were calculated from within subclass deviation sums of squares and products. Asterisk (*) indicates a correlation significantly different from zero at a probability of .01 or less.

Table 17 gives means of the number of items checked for subjects in each adjustment category and results of analysis of variance tests to show significant differences. The successful group ($N = 64$) had significantly more favorable ratings on all keys by both teachers and houseparents, separately and combined, except for teacher ratings on Key 2 items, for which the difference in means was not significant.

Total key scores on these tables represent a weighting of keys that corresponds to the approximate ratio of mean differences on teacher ratings between successful and unsuccessful groups. The differences are +4.81, −1.95, and −2.10, for Keys 1, 2, and 3, respectively. Roughly, the ratio of these is 3:1:1. If negative scores are eliminated by adding a constant, the total score may be written as $50 + 3X_1 - X_2 - X_3$, where X_1, X_2, and X_3 refer to scores on Keys 1, 2, and 3. A more precise method would require a different formula

TABLE 17

Means of Teacher, Houseparent, and Combined Ratings on Adjective Checklist and Results of Analysis of Variance Tests for Mean Differences between Adjustment Groups

Rater and Key	Adjustment Group: Successful (N = 64)	Adjustment Group: Unsuccessful (N = 43)	F^a
Teacher			
Key 1	6.72	1.81	31.73*
Key 2	1.81	3.86	6.30
Key 3	2.25	4.40	14.00*
Total key	68.00	47.47	20.57*
Houseparent			
Key 1	7.03	2.74	24.93*
Key 2	2.77	6.74	23.06*
Key 3	2.73	5.44	18.24*
Total key	65.30	46.05	20.86*
Both			
Key 1	13.75	4.66	37.02*
Key 2	4.67	10.60	20.34*
Key 3	4.98	9.84	24.03*
Total key	131.39	93.51	37.36*

[a] Degrees of freedom are $n_1 = 1$, $n_2 = 105$. Asterisk (*) indicates a significant mean difference at a probability of .01 or less.

for scores of each kind of rater. One such method would account for profile differences between the successful and unsuccessful by summation of squares of differences of group means from grand means.

These formulae were derived from data in Table 17:

$$Z_t = 9.62\,X_1 - 3.91\,X_2 - 4.29\,X_3 - 15.98$$
$$Z_h = 8.57\,X_1 - 7.98\,X_2 - 5.41\,X_3 + 18.06$$
$$Z_b = 18.20\,X_1 - 11.87\,X_2 - 9.71\,X_3 - 4.87$$

Z_t and Z_h represent teacher and houseparent ratings; Z_b represents the combined ratings. If a subject's Z score is greater than zero, his profile is considered more like that of the successful group than the unsuccessful. Therefore, Z scores may be used for prediction.

Follow-up status of the 107 subjects was also computed by the discriminant function, described in the preceding section. We may contrast discriminant classifications with those obtained through Z scores. Table 18 gives percentages of subjects classified successful or unsuccessful by each method and certain combinations of methods, together with *chi*-square tests that show symmetry of percentages of correct classifications (*symmetry* refers to correct classification of about the same proportion of successful and unsuccessful subjects). Percentages of correct classifications common to pairs of methods appear in Table 63, Appendix B.

The proportion of successful subjects ranged from 49.5%, when teacher ratings were used alone, to 77.0%, when the discriminant function was used with either houseparent ratings or combined teacher-houseparent ratings. Used separately, the four methods classified symmetrical proportions of the successful and unsuccessful.

TABLE 18

Percentages of 107 Dischargees Classified Successful by Dichotomous Methods and Chi-Square Tests for Symmetry of Classification for Criterion Groups

Method[a]	Rate[b]	*Chi-Square*[c]
	per cent	
Discriminant function (Y_e)	54.2	0.047
Teacher rating (Z_t)	49.5	3.003
Houseparent rating (Z_h)	51.4	2.454
Combined teacher-houseparent rating (Z_c)	54.2	1.280
Y_e and Z_t	75.7	9.000*
Y_e and Z_h	77.0	11.043*
Y_e and Z_c	77.0	12.448*
Z_t and Z_h	60.7	0.024
Y_e, Z_t, and Z_h	53.3	1.600

[a] For pairwise methods, one or both methods must indicate success; for the triplet combination, two or more.

[b] To be compared with the base rate of 59.8% successful ($N = 64$).

[c] Asterisk (*) indicates a significant difference in percentages of correct classifications at a probability of .01 or less.

TABLE 19

Percentages of 107 Dischargees Correctly Classified by Dichotomous Methods and *Phi* Coefficients with Criterion Classifications

Method[a]	Adjustment Group: Successful ($N = 64$)	Adjustment Group: Unsuccessful ($N = 43$)	Adjustment Group: Both ($N = 107$)	*Phi*[b]
	per cent	per cent	per cent	
Y_e	65.6	62.8	64.5	0.280*
Z_t	67.2	76.7	71.0	0.431*
Z_h	67.2	72.1	69.2	0.383*
Z_c	73.4	74.4	73.8	0.471*
Y_e and Z_t	90.6	46.5	72.9	0.424*
Y_e and Z_h	90.6	41.9	71.0	0.382*
Y_e and Z_c	92.2	44.2	72.9	0.428*
Z_t and Z_h	78.1	65.1	72.9	0.434*
Y_e, Z_t, and Z_h	71.9	74.4	72.9	0.455*

[a] Y_e, Z_t, Z_h, and Z_c refer to the discriminant function, the teacher rating, houseparent rating, and combined teacher-houseparent rating, respectively.

[b] Asterisk (*) indicates a significant relation to criterion classification at a probability of .01 or less.

Table 19 contains the percentages of subjects in each adjustment group who were classified correctly. The table shows that where lack of symmetrical classification appears in Table 18, relatively small percentages of the unsuccessful were classified correctly. Table 19 also contains *phi* coefficients that show the relation of criterion classifications to those determined by each dichotomous method, used separately *or* in combination. All coefficients are significant. The strongest relation to criterion classifications was obtained by using the combined teacher-houseparent rating alone; the weakest, by using the discriminant function alone.

These relations should encourage further use of dynamic data. Further use of the checklist itself, in a discriminant analysis with pre-institutional data, should be fruitful, since classification by the discriminant function was not significantly related to classifications by the Z scores (see Table 64, Appendix B). Undoubtedly, each method measures distinct factors conducive to post-institutional success.

Chapter 5

The Comparative Study Design

SELECTION OF SAMPLES

The comparative study was designed to specify conditions associated with institutional versus community care and education of educable retarded children. To do this, in Fall, 1957, two samples of children were selected. One consisted of institutionalized pupils at the Owatonna school; the other consisted of pupils attending special day classes in Minnesota public schools. Investigators obtained biographical data on the pupils and information on their intelligence, personality characteristics, and educational achievement.

To select the day class sample, investigators established a sampling frame that designated potential subjects. They decided the frame should include no child older than 15, since Minnesota's compulsory school attendance law does not require children 16 years or older to stay in school, and no child younger than 11, to insure proper distribution of achievement scores on the initial testing. All children selected, therefore, were to have birth years between 1942 and 1946, inclusive.

The sampling frame was established from 1956-57 data, since 1957-58 data were not available. The data showed that 3,320 children, born between 1938 and 1951, inclusive, were attending special classes in Minnesota. About half the pupils (1,664) had birth years between 1942 and 1946.

Two classes at the Michael Dowling School for crippled children were eliminated because of the school's special nature; this left 1,597 pupils available for the sampling frame. About twice as many were attending classes on the elementary level, as opposed to the junior-senior high school level (class levels were designated from those of schools where classes were held). More than two-thirds attended classes in Minneapolis, St. Paul, or Duluth. Investigators decided to select a proportionate number of pupils from each of these cities and from all other cities combined (see Table 65, Appendix D, for a distribution of the 1956-57 enrollment in special classes by birth year of subject, location of school, and level of class).

An appropriate sample was considered to include about 10% of all pupils in the designated age range. Eight sub-populations were available, one for each combination of the four city categories and the two categories of instruction level. Within each sub-population, names of the schools were alphabetized, and pupils were numbered. Random sampling was done using tables of random numbers. As a pupil's number was drawn, all pupils in his class were considered included in the sampling frame. Numbers were drawn until this sample included 10% of the pupils in each sub-population, a proportion which amounted to 207 pupils in 15 classes.

Minneapolis was represented by five classes in five schools—three elementary and two junior-senior high. St. Paul was represented by three classes in two schools—one elementary and one junior-senior high. Duluth was represented by two classes in two schools, one on each instructional level. Other cities were represented by five classes in five schools—three elementary and two junior-senior highs—in Bloomington, Cloquet, Hibbing, Red Wing, and Roseville (see Table 66, Appendix D, for a distribution of the 207 pupils).

Of the 207 persons designated, 173 were located in the 1957-58 school population. They comprised the actual sample. Table 20 shows a distribution of the 173 by city, sex, and year of birth.

For the institutionalized sample, it was decided to select all pupils with appropriate birth years who were living at Owatonna in the fall of 1957. Available were 158 pupils. Table 21 shows their distribution by sex and year of birth.

TABLE 20

Distribution of 173 Subjects from Public School Special Classes for Educable Retarded Children by Birth Year, City, and Sex

	Birth Year					
City and Sex	1942	1943	1944	1945	1946	All years
Minneapolis						
Male	4	6	1	5	11	27
Female	8	5	4	8	2	27
Both	12	11	5	13	13	54
St. Paul						
Male	4	4	8	8	1	25
Female	2	1	7	10	1	21
Both	6	5	15	18	2	46
Duluth						
Male	2	7	5	3	1	18
Female	4	0	1	3	0	8
Both	6	7	6	6	1	26
Other cities						
Male	3	8	8	8	8	35
Female	4	2	4	2	0	12
Both	7	10	12	10	8	47
All cities						
Male	13	25	22	24	21	105
Female	18	8	16	23	3	68
Both	31	33	38	47	24	173

TABLE 21

Distribution of 158 Subjects from the Owatonna State School by Sex and Birth Year

	Sex		
Birth Year	Male	Female	Both
1942	40	14	54
1943	20	15	35
1944	19	12	31
1945	15	5	20
1946	8	10	18
All years	102	56	158

COLLECTION OF DATA

Investigators tested subjects with the WISC and the Primary Battery of the Stanford Achievement Test, Form J. They also asked teachers to complete for each subject two biographical data sheets and two forms dealing with behavior characteristics.

The WISC was administered to each subject individually. Intelligence quotients were calculated from all 12 subtests. Administration took place during November, 1957, and from the middle of January, 1958, to the middle of April.

A brief review of literature on the standardization of the WISC and its use for retarded children is given in Chapter 2. Because of its wide use, further description of the test is not considered necessary at this time.

Biographical data were obtained with a Speech Information Sheet and a Supplementary Biographical Data Sheet (for forms, see Exhibits H and I, Appendix C). Data on behavior were obtained with Reynolds' (65) Adjective Checklist and a Behavior Rating Scale (see Exhibits J and K, Appendix C). The first two forms were designed especially for this study. Reynolds' checklist is described in Chapter 3. The Behavior Rating Scale is an adaption of one developed by Dr. Harriet Blodgett and her staff for retarded children at Sheltering Arms, a specialized research and day care center in Minneapolis, Minnesota.

The Behavior Rating Scale was designed to determine a child's basal level of behavior. It consists of 14 items, each of which has five descriptive categories. The rater is to indicate the category under each area that best describes a child's typical behavior. If day-to-day behavior varies enough so that more than one category is appropriate, the rater may check the other categories with a different kind of mark.

The 14 items cover these areas: (a) conformity to requests—general cooperativeness; (b) individual constructive activities; (c) participation with the group, (d) interaction with individuals, (e) interest and progress in learning, (f) independence and self-help, (g) persistence with tasks, (h) constructive conversation and communication, (i) excessive conversation, (j) stability of activity level—degree of freedom from hyperactivity, (k) absence of anti-social behavior and fighting, (l) absence of irritability, (m) ability to tolerate frustration, and (n) apparent health.

Categories under each area are ordered from least to most desirable behavior. If scores of 1 through 5 are assigned to the five categories, a total score may be obtained by summation over the 14 items. Total scores would range from 14 through 70.

Form J of the Primary Battery of the Stanford Achievement Test was used to assess the pupils' educational achievement. In view of the mental and educational level of the group as a whole, investigators felt the Primary Battery would be most appropriate, although the Elementary Battery may have been better for certain individuals.

Information on the test's construction and standardization is presented in the manual of directions that accompanies the test booklets (45). The authors state that items were selected on the basis of a thorough analysis of textbooks and research literature in the content areas. Final selection was made on the basis of a tryout on approximately 12,000 students, chosen with regard for representative regional distribution, rural-urban residence, and size of school system attended. Investigators paid particular attention to the percentage of pupils passing the items at various grade levels. Seven original forms were drawn up; five are included in the final test.

Form J was standardized on 103,710 students attending grades 1 through 9 in 38 states. Investigators tried to make schools representative of each state in terms of number and kinds of systems present. For the standardization sample, they tested 340 school systems between April 15 and May 15, 1952.

Split-half (corrected) reliability coefficients for the five subtests of the primary battery are reported to range from .86 to .96, for grades 1 and 2. Standard errors of measurement range from 1.3 to 2.5 raw score points.

According to the manual, the primary battery is designed for children in grades 1, 2, and the first half of 3. Test 1, Paragraph Meaning, consists of a series of paragraphs graduated in difficulty and calling on ability to recognize and comprehend words and ideas. The pupil is to answer 48 multiple-choice questions. Test 2, Word Meaning, consists of 38 sentences that measure knowledge of synonyms, simple definitions, ready associations, and, in some cases, comprehension of higher-level word concepts. The pupil is to complete the sentences by multiple choice. Test 3, Spelling, consists of a 30-item dictation spelling test, for which the administrator reads aloud the word and a sentence using it. Test 4, Arithmetic Reasoning, consists of 25 items. Thirteen are pictorial. These test basic abilities including knowledge of quantitative concepts such as relationships, location, counting, time, and measurement. The other items are verbal problems testing reading and computational ability as well as basic knowledge of measurement and the monetary system. For pictorial items, the administrator reads directions aloud. Other items are done individually. Test 5, Arithmetic Computation, consists of 46 simple arithmetic problems, mostly addition and subtraction. Only five multiplication and two division problems are included.

Success in this achievement test, as in most, depends in part on the teaching and curriculum of the school. The amount of exposure to reading, for instance, may vary considerably among retardates of the same CA level, even within groups institutionalized or in the community. The retardate who is recognized before he has had much academic experience may not be exposed to reading until CA 8 or 9, if the recommendations of some authorities are followed. As Kirk and Johnson (47) state, "When a mentally handicapped child is ready to learn to read and spell he is usually nine, ten, or eleven years of age" (p. 274). Before this time, an intensive, prolonged reading-readiness program is recommended.

The problem of different educational techniques is not within the realm of this study, but it may partly account for the differences in achievement scores of the two groups—in reading and other areas. Certainly, generalizations about the academic potential and its relation to MA cannot be made on the basis of achievement test results for this group.

The Stanford Achievement Test was first administered during December, 1957, and the first half of January, 1958. Retesting was done during the last half of April and all of May, 1959. Sixteen months elapsed between the two testings.

THE ANALYSIS

Analysis was done in two parts. Data from the WISC, the initial Stanford Achievement Test, and behavior data sheets were analyzed for all 331 subjects sampled in Fall, 1957. Data from Stanford retests were analyzed for a subgroup of 177, all subjects born in 1944, 1945, or 1946. Results of the analysis are presented in Chapter 6. This section of Chapter 5 describes the analysis, in an effort to clarify the study's design.

Retest data were analyzed for only the subgroup because many day class pupils had left school before all retesting was done. Table 22 presents numbers of subjects for whom retest scores were obtained and the percentages of the original samples these numbers represent. Ninety per cent of all subjects were retested. Of the day class sample, only 84% were retested, compared with 96% of the institutionalized sample. The discrepancy occurred because Minnesota's compulsory school attendance law permits students to leave school at age 16.

TABLE 22

Numbers and Percentages of Subjects for Whom Achievement Retest Results Were Obtained by Location, Birth Year, and Sex

	Location					
	Day Class		Institutionalized		Both	
Birth Year and Sex	*N*	Per cent	*N*	Per cent	*N*	Per cent
1942						
Male	7	53.8	36	90.0	43	81.1
Female	10	55.6	13	92.9	23	71.9
Both	17	54.8	49	90.7	66	77.6
1943						
Male	14	56.0	19	95.0	33	73.3
Female	7	87.5	15	100.0	22	95.7
Both	21	63.6	34	97.1	55	80.9
1944						
Male	22	100.0	19	100.0	41	100.0
Female	16	100.0	12	100.0	28	100.0
Both	38	100.0	31	100.0	69	100.0
1945						
Male	24	100.0	15	100.0	39	100.0
Female	22	95.7	5	100.0	27	96.4
Both	46	97.9	20	100.0	66	98.5
1946						
Male	21	100.0	8	100.0	29	100.0
Female	3	100.0	10	100.0	13	100.0
Both	24	100.0	18	100.0	42	100.0
All years						
Male	88	83.8	97	95.1	185	89.4
Female	58	85.3	55	98.2	113	91.1
Both	146	84.4	152	96.2	298	90.0

Note.—Tables 20 and 21 give numbers of subjects for whom initial scores were available.

The high drop-out rate was expected. It necessitated exclusion of subjects of drop-out age at retest time (birth years 1942 and 1943) from an analysis of retest scores. Of pupils born in 1944, 1945, and 1946, however, all but one were located and retested.

In both parts of the analysis, year differences within sex and location subclasses were removed from the error terms before testing significance of mean differences or computing correlation coefficients. Sex differences were tested separately for special class and institutionalized subjects and the groups combined. Location (i.e., institutional vs. day class) differences were tested separately for boys and girls and the groups combined.

Subjects may be said to be "nested" by year groups. Year differences were not especially important, but their effect was controlled in estimating the size of error variance in the analysis of variance.

In the first part of the analysis, the 331 subjects provided 311 degrees of freedom for error sources of variation. Day class and institutionalized groups contributed 163 and 148, respectively. The 105 day class boys contributed 100; the 68 girls, 63. The 102 institutionalized boys contributed 97; the 56 girls, 51. Totals for all boys and all girls are 197 and 114, respectively. Each corresponding error component was used to test mean differences between VS and PS IQs obtained with the WISC. Error components for combinations of subclasses were used to test sex and location effects of the verbal-performance variable and other variables.

In the second part of the analysis, the 177 subjects provided 165 degrees of freedom for error sources of variation, since the number of year-sex-location subclasses was 12. Initial measures were again compared, as well as retest scores and the corresponding gain scores for the five areas of achievement. When appropriate, analysis of covariance was used to remove the effect of the initial achievement level or intellectual or personality characteristics.

Biographical data were not analyzed, since information was not obtained for all subjects on all items. For instance, information on such items as familial deficiency background and record of delinquency was not available to most special class teachers who completed the forms. Tabulations of the data obtained appear in Tables 67 through 69, Appendix D.

For institutionalized subjects, however, biographical data were used to contrast groups from communities having special day classes for retardates with groups from communities having none. Investigators tried to determine whether differential selection of institutionalized subjects occurred.

CHAPTER 6

Comparative Study Results

PART ONE—TOTAL GROUP

Intellectual Characteristics

One common question about groups of subjects deals with intellectual equality. To answer this question about groups in the comparative study, the WISC was administered to all 331 subjects.

Table 23 gives mean PS, VS, and FS scores for subjects grouped by sex and location (subjects were *located* in day classes or the institution). The table also gives differences between mean VS and PS scores. Table 24 gives results of analysis of variance tests for significant differences in mean scores and verbal-performance (V-P) differences (for standard deviations, see Table 70, Appendix D).

Analysis of both tables shows that all sex differences favored boys and that total boys differed significantly from girls in VS, PS, and FS scores and the mean V-P difference. Institutionalized boys differed significantly from institutionalized girls on the same measures, although day class boys differed significantly from day class girls only in mean VS and FS scores.

Most location differences favored day class subjects. Day class boys and girls, separately and combined, had significantly higher VS, PS, and FS means than institutionalized counterparts. All institutionalized groups had greater V-P differences than day class groups, although differences were not significant.

Table 25 gives percentages of subjects with V>P, P>V, and P=V, with results of tests for significance of mean V-P differences. The tests compared

TABLE 23

Means of WISC Verbal, Performance, and Full-Scale IQs by Sex and Location of Subjects

		Measure			
Group	*N*	Verbal	Performance	Full-Scale	V-P Difference
Day class					
Boys	105	70.84	77.13	71.24	−6.30
Girls	68	67.84	69.12	65.49	−1.28
Institutionalized					
Boys	102	61.03	69.75	61.86	−8.73
Girls	56	55.64	57.70	52.50	−2.06
Boys total	207	66.00	73.50	66.62	−7.49
Girls total	124	62.33	63.96	59.62	−1.63
Day class total	173	69.66	73.98	68.98	−4.32
Institutionalized total	158	59.12	65.48	58.54	−6.36
Grand total	331	64.63	69.92	64.00	−5.30

each mean V-P difference shown in Table 23 with a theoretical difference of zero. Table 25 shows that boys, in all groups, had P>V. Boys' V-P differences were significant. Girls, in all groups, also had P>V, although P-V differences were not significant. Total location groups had P>V. Differences were significant, since boys outnumbered girls, and their results outweighed the non-significant results for girls alone.

TABLE 24

F-Test Results for Sex and Location Effects in the Analysis of Variance of WISC Verbal, Performance, and Full-Scale IQs

		Measure			
Comparison and Group	*N*	Verbal	Performance	Full-Scale	V-P Difference
Sex					
Day class	173	3.97	11.18*	9.77*	5.88
Institutionalized	158	15.44*	24.88*	27.69*	10.20*
Total	331	12.87*	31.37*	29.73*	15.91*
Location					
Boys	207	61.83*	12.48*	36.26*	1.74
Girls	124	55.14*	17.94*	39.33*	0.12
Total	331	112.73*	26.54*	70.38*	2.05

Note.—Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}20 = 311$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}10$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

TABLE 25

Percentages of Day Class and Institutionalized Subjects with Differences in WISC Verbal and Performance IQs and Results of Significance Tests on Mean Differences

		Verbal-Performance Differential			
Group	*N*	V>P	V=P	P>V	*F*[a]
		per cent	per cent	per cent	
Day class					
Boys	105	26.7	1.9	71.4	23.75*
Girls	68	42.6	5.9	51.5	0.62
Institutionalized					
Boys	102	26.5	3.9	69.6	44.34*
Girls	56	33.9	5.4	60.7	1.89
Boys total	207	26.6	2.9	70.5	66.34*
Girls total	124	38.7	5.6	55.7	2.13
Day class total	173	32.9	3.5	63.6	40.51*
Institutionalized total	158	29.1	4.4	66.5	18.33*
Grand total	331	31.1	3.9	65.0	55.40*

[a] Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}5$ for day class and institutionalized subgroups, $n_2 = N\text{-}10$ for total sex and location groups, and $n_2 = N\text{-}20 = 311$ for the grand total of subjects. Asterisk (*) indicates a significant difference at probability of .01 or less.

Table 26 gives coefficients of correlation between VS and PS IQs for various sex and location groups. All values differed significantly from zero. They ranged from .460, for institutionalized boys, to .613, for institutionalized girls. Within groups, the average value was .513, somewhat lower than comparable values for WISC standardization groups (70). The reason may be that comparative study subjects had a smaller range of scores than subjects in the standardization population.

The WISC is composed of 12 subtests. Six make up the Verbal Scale; six, the Performance Scale. Although the reliability of subtest scores is lower than that of scale IQs, it is interesting to compare subtest score means. Tables 27 and 28 give mean scores on the verbal and performance subtests respectively, for sex and location groups. Tables 29 and 30 give results of analysis of variance tests on the means (for standard deviations, see Tables 71 and 72, Appendix D).

TABLE 26

Correlation Coefficients of WISC Verbal and Performance IQs by Sex and Location of Subjects

	Location					
	Day Class		Institutionalized		Total	
Sex	*N*	*r*	*N*	*r*	*N*	*r*
Boys	105	.509	102	.460	207	.486
Girls	68	.531	56	.613	124	.558
Total	173	.518	158	.507	331	.513

Note.—Degrees of freedom associated with each coefficient are *N*-6 for day class and institutionalized subgroups, *N*-11 for total sex and location groups, and *N*-21 = 310 for the grand total of subjects. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 27

Means of WISC Verbal-Scale IQs by Sex and Location of Subjects

		Measure					
Group	*N*	I	C	A	S	V	DS
Day class							
Boys	105	5.48	6.08	4.79	5.68	4.51	5.50
Girls	68	5.03	5.04	4.68	4.93	3.60	5.93
Institutionalized							
Boys	102	4.30	4.11	3.23	3.84	3.31	3.98
Girls	56	3.29	2.87	2.57	3.46	2.29	3.20
Boys total	207	4.90	5.11	4.02	4.77	3.92	4.75
Girls total	124	4.24	4.06	3.73	4.27	3.01	4.69
Day class total	173	5.30	5.67	4.75	5.38	4.16	5.67
Institutionalized total	158	3.94	3.67	2.99	3.71	2.95	3.70
Grand total	331	4.65	4.72	3.91	4.58	3.58	4.73

Note.—Verbal measures are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span.

- On the average, mean scores on performance subtests were higher than those on verbal subtests. This result is consistent with the one that showed PS IQs were significantly higher than VS IQs.

Although all sex and location differences were not significant, with a few exceptions values were higher for boys than girls and for day class subjects than those in institutions. Exceptions occurred for the Digit Span (verbal) subtest, on which day class girls scored higher than day class boys, and for the Coding (performance) subtest, on which day class girls and total girls

TABLE 28

Means of WISC Performance-Scale IQs by Sex and Location of Subjects

		Measure					
Group	*N*	PC	PA	BD	OA	Cd	M
Day class							
Boys	105	6.86	6.45	6.82	7.56	5.94	6.73
Girls	68	5.84	5.12	4.82	5.78	7.16	4.62
Institutionalized							
Boys	102	6.50	4.65	5.39	7.20	4.23	5.96
Girls	56	5.20	2.61	3.12	4.91	4.14	3.75
Boys total	207	6.68	5.56	6.12	7.38	5.10	6.28
Girls total	124	5.55	3.98	4.06	5.39	5.80	4.23
Day class total	173	6.46	5.92	6.03	6.86	6.42	5.81
Institutionalized total	158	6.04	3.92	4.59	6.39	4.20	5.18
Grand total	331	6.26	4.97	5.34	6.63	5.36	5.51

Note.—Performance measures are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes.

TABLE 29

F-Test Results for Sex and Location Effects in the Analysis of Variance of WISC Verbal-Scale IQs

		Measure					
Comparison and Group	*N*	I	C	A	S	V	DS
Sex							
Day class	173	3.12	9.43*	0.14	3.80	8.46*	1.02
Institutionalized	158	11.84*	12.78*	6.26	1.30	12.11*	3.85
Total	331	11.57*	18.75*	2.13	3.91	17.90*	0.04
Location							
Boys	207	21.60*	48.94*	39.57*	33.49*	22.00*	18.92*
Girls	124	42.55*	27.95*	44.78*	13.31*	13.22*	33.84*
Total	331	52.67*	73.56*	80.66*	45.33*	33.18*	49.17*

Note.—Verbal measures are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Dight Span. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}20 = 311$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}10$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

TABLE 30

F-Test Results for Sex and Location Effects in the Analysis of Variance of WISC Performance-Scale IQs

		Measure					
Comparison and Group	*N*	PC	PA	BD	OA	Cd	M
Sex							
Day class	173	4.96	8.40*	17.87*	12.84*	8.23*	17.52*
Institutionalized	158	10.09*	20.97*	24.27*	15.83*	0.04	21.90*
Total	331	13.41*	24.18*	38.86*	27.98*	5.51	37.89*
Location							
Boys	207	0.85	21.26*	11.37*	0.65	25.26*	2.28
Girls	124	1.86	23.87*	12.52*	2.01	33.05*	2.76
Total	331	1.95	41.48*	20.40*	1.69	59.03*	3.84

Note.—Performance measures are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}20 = 311$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}10$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

scored higher than boys in the comparable groups. The difference for day class girls on Coding was the only significant one favoring girls.

For verbal subtests, all means for day class subjects were significantly higher than means for subjects in institutions. Day class boys had significantly higher means than day class girls on Comprehension and Vocabulary. Institutionalized boys and total boys had significantly higher means than girls on Information, Comprehension, and Vocabulary. No significant sex differences were observed for Arithmetic, Similarities, or Digit Span.

Of performance subtests, means on Picture Arrangement, Block Design, and Coding were significantly higher for day class subjects, whether or not boys' scores were analyzed separately from girls'. Location differences for the other tests were not significant. In the day class group boys scored significantly higher than girls on Picture Arrangement, Block Design, Object Assembly, and Mazes. Girls scored significantly higher than boys on Coding. In the institutionalized and total groups, boys scored significantly higher than girls on all subtests but Coding. The difference on this subtest was not significant.

Table 31 gives intercorrelations between all possible pairs of subtests for the 331 subjects combined (for intercorrelations for subgroups, see Tables 73 through 80, Appendix D). Only three of the 66 coefficients did not differ significantly from zero. These coefficients involved Mazes, a performance subtest, and its relation to Information, Similarities, and Vocabulary.

As expected, verbal subtests correlated more highly with one another than with performance subtests, which, in turn, correlated more highly with one another than with verbal subtests.

It is not surprising that differences were observed between mean subtest scores of day class and institutionalized subjects. The sex differences in verbal-performance intelligence, however, are surprising and noteworthy, since the

TABLE 31

Intercorrelations of Scores on 12 WISC Subtests for 331 Day Class and Institutionalized Subjects

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
	Measure										
I	.447*	.482*	.443*	.502*	.309*	.235*	.348*	.210*	.181*	.335*	.113
C		.345*	.386*	.531*	.158*	.280*	.387*	.236*	.224*	.356*	.236*
A			.408*	.297*	.472*	.264*	.428*	.360*	.267*	.430*	.329*
S				.482*	.305*	.248*	.398*	.306*	.204*	.209*	.114
V					.225*	.162*	.378*	.204*	.206*	.254*	.132
DS						.215*	.345*	.244*	.248*	.254*	.187*
PC							.470*	.521*	.500*	.366*	.378*
PA								.469*	.483*	.451*	.419*
BD									.632*	.353*	.470*
OA										.391*	.451*
Cd											.401*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-21 = 310. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

WISC standardization population did not show a significant difference in mean PS and VS IQs for the sexes (70), and little WISC research with other groups has been done in this area. Is it possible that verbal-performance sex differences occur at intelligence levels other than those dealt with in this study?

Also of interest is that day class girls scored significantly higher than boys on only one subtest, Coding, a performance subtest at that. This result requires further study of WISC patterning of sexes.

Personality Ratings

Subjects were rated on personality characteristics after initial administration of the achievement test and before administration of the WISC. Raters used the Behavior Rating Scale and the Adjective Checklist, forms which produced five scores—one on the Behavior Rating Scale, a total weighted score on the Adjective Checklist, and three part-scores on the three Adjective Checklist keys.

Table 32 gives mean scores on each measure for sex and location groups. Table 33 summarizes results of analysis of variance tests on the means (for standard deviations, see Table 81, Appendix D).

Average scores on the Behavior Rating Scale were somewhat higher than 42, the hypothetical mid-value representing a score of 3 on each of the scale's 14 items. Mean scores on Key 1 (positive adjectives) of the Adjective Checklist distributed themselves more symmetrically than mean scores on Keys 2 and 3 (negative adjectives), distributions of which were positively skewed.

TABLE 32

Means of Behavior Rating Scale Scores and Adjective Checklist Part and Total Scores by Sex and Location of Subjects

		Measure				
		Behavior Rating Scale	Adjective Checklist			
Group	*N*		Key 1	Key 2	Key 3	Total[a]
Day class						
Boys	105	46.03	6.17	1.71	2.92	63.88
Girls	68	46.04	7.06	1.18	2.47	67.53
Institutionalized						
Boys	102	52.35	9.44	1.34	2.14	74.84
Girls	56	52.66	10.89	0.50	1.30	80.87
Boys total	207	49.14	7.78	1.53	2.54	69.28
Girls total	124	49.03	8.79	0.87	1.94	73.56
Day class total	173	46.03	6.52	1.50	2.75	65.31
Institutionalized total	158	52.46	9.96	1.04	1.84	76.98
Grand total	331	49.10	8.16	1.28	2.31	70.88

[a] Total Adjective Checklist score is computed by the formula: 50 + 3 (Key 1)-(Key 2)-(Key 3).

TABLE 33

F-Test Results for Sex and Location Effects in the Analysis of Variance of Behavior Rating Scale Scores and Adjective Checklist Part and Total Scores

		Measure				
		Behavior Rating Scale	Adjective Checklist			
Comparison and Group	*N*		Key 1	Key 2	Key 3	Total[a]
Sex						
Day class	173	<0.01	1.39	1.96	1.24	1.71
Institutionalized	158	0.03	3.13	3.77	3.08	3.56
Total	331	0.01	3.31	5.26	3.65	4.11
Location						
Boys	207	18.59*	23.17*	0.82	3.65	16.80*
Girls	124	14.20*	19.02*	5.42	8.01*	18.14*
Total	331	32.42*	40.92*	2.70	9.04*	32.58*

Note.—Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}20 = 311$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}10$ for others groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

[a] Total Adjective Checklist score is computed by the formula 50 + 3 (Key 1)-(Key 2)-(Key 3).

No significant sex differences were observed for any of the five measures. On four measures, however, institutionalized subjects were rated significantly more favorably than day class counterparts. Institutionalized boys and girls, considered separately and combined, were rated significantly more favorably on the Behavior Rating Scale, Adjective Checklist Key 1, and the total Adective Checklist. Institutionalized girls and total institutionalized subjects were rated significantly more favorably on Key 3. No significant location differences were observed for scores on Key 2.

The direction of location differences has one of two explanations: (a) the Owatonna school excluded retardates with certain undesirable personality characteristics, or (b) Owatonna teachers rated pupils from a different viewpoint than did day class teachers. The second explanation is probably more correct. The school does exclude some extremely deviated persons, but it is difficult to believe that its population is more favorable in personality than day class populations.

Table 34 gives coefficients representing the internal consistency reliability of all five measures. Breakdown is by sex and location groups. Coefficients, computed by the Hoyt (41) method, range from .653, for days class girls on Key 3, to .957, for institutionalized boys on the total Adjective Checklist. In general, the reliabilities of Keys 2 and 3 were lower than that of Key 1, the total Adjective Checklist, or the Behavior Rating Scale.

For sex and location groups, Table 35 gives coefficients of the correlation between Behavior Rating Scale scores and total and part scores on the Adjective Checklist. Table 36 gives coefficients of correlation between the three Adjective Checklist part scores. Coefficients in the two tables vary considerably: absolute values range from .390 to .872.

TABLE 34

Reliability Coefficients of Behavior Rating Scale Scores and Adjective Checklist Part and Total Scores by Sex and Location of Subjects

		Measure				
		Behavior Rating Scale	Adjective Checklist			
Group	N		Key 1	Key 2	Key 3	Total[a]
Day class						
Boys	105	.903	.895	.872	.791	.929
Girls	68	.872	.933	.724	.653	.943
Institutionalized						
Boys	102	.917	.931	.933	.869	.957
Girls	56	.931	.911	.785	.837	.935
Boys total	207	.910	.915	.904	.831	.945
Girls total	124	.904	.925	.743	.738	.940
Day class total	173	.893	.912	.842	.752	.935
Institutionalized total	158	.922	.926	.919	.861	.951
Grand total	331	.908	.919	.880	.807	.943

Note.—Reliability coefficients are computed by Hoyt's (41) analysis of variance method.

[a] Total Adjective Checklist score is computed by the formula 50 + 3 (Key 1)-(Key 2)-(Key 3).

TABLE 35

Correlation Coefficients of Behavior Rating Scale Scores with Part and Total Adjective Checklist Scores by Sex and Location of Subjects

		Adjective Checklist Measure			
Group	N	Key 1	Key 2	Key 3	Total[a]
Day class					
Boys	105	.667	−.490	−.673	.701
Girls	68	.477	−.390	−.485	.505
Institutionalized					
Boys	102	.742	−.730	−.763	.781
Girls	56	.703	−.483	−.604	.705
Boys total	207	.704	−.612	−.718	.740
Girls total	124	.570	−.418	−.542	.590
Day class total	173	.589	−.460	−.616	.628
Institutionalized total	158	.728	−.650	−.712	.754
Grand total	331	.657	−.555	−.665	.691

Note.—Degrees of freedom associated with each coefficient are N-6 for day class and institutionalized subgroups, N-11 for total sex and location groups, and $N\text{-}21 = 310$ for the grand total of subjects. All coefficients are significantly different from zero at a probability of .01 or less.

[a] Total Adjective Checklist score is computed by the formula 50 + 3 (Key 1)-(Key 2)-(Key 3).

Data introduced in this section indicate that further discussion of the Adjective Checklist should involve no part scores. Scores on Keys 2 and 3 have assymetrical distributions and low reliability coefficients. Analysis of the total score indicates strongly the influence of Key 1.

Initial Achievement

The Stanford Achievement Test has five subtests—two reading (Word Meaning and Paragraph Meaning), two arithmetic (Arithmetic Reasoning and Arithmetic Computation), and one spelling. Table 37 gives mean scores

TABLE 36

Intercorrelations of Adjective Checklist Part Scores by Sex and Location of Subjects

		Adjective Checklist Intercorrelation		
Group	*N*	Key 1-Key 2	Key 1-Key 3	Key 2-Key 3
Day class				
Boys	105	−.539	−.739	.687
Girls	68	−.661	−.586	.529
Institutionalized				
Boys	102	−.706	−.872	.824
Girls	56	−.663	−.799	.707
Boys total	207	−.630	−.812	.761
Girls total	124	−.660	−.671	.589
Day class total	173	−.558	−.674	.645
Institutionalized total	158	−.677	−.852	.793
Grand total	331	−.617	−.763	.721

Note.—Degrees of freedom associated with each coefficient are *N*-6 for day class and institutionalized subgroups, *N*-11 for total sex and location groups, and *N*-21 = 310 for the grand total of subjects. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 37

Means of Stanford Achievement Subtest Scores by Sex and Location of Subjects

		Measure				
Group	*N*	PM	WM	S	AR	AC
Day class						
Boys	105	24.12	20.74	16.30	16.24	31.82
Girls	68	30.06	25.71	21.59	17.12	35.01
Institutionalized						
Boys	102	23.08	18.05	13.13	13.67	23.26
Girls	56	24.18	19.86	15.91	11.75	20.34
Boys total	207	23.61	19.42	14.73	14.97	27.60
Girls total	124	27.40	23.06	19.02	14.69	28.39
Day class total	173	26.46	22.69	18.38	16.58	33.08
Institutionalized total	158	23.47	18.69	14.11	12.99	22.23
Grand total	331	25.03	20.78	16.34	14.87	27.90

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation.

TABLE 38

F-Test Results for Sex and Location Effects in the Analysis of Variance of Stanford Achievement Subtest Scores

Comparison and Group	*N*	Measure				
		PM	WM	S	AR	AC
Sex						
Day class	173	10.13*	11.45*	19.91*	1.35	3.72
Institutionalized	158	0.27	1.26	3.68	5.29	1.83
Total	331	7.39*	11.31*	21.42*	0.25	0.34
Location						
Boys	207	0.37	3.94	7.48*	13.18*	25.60*
Girls	124	7.24*	12.43*	16.01*	41.22*	52.48*
Total	331	4.88	14.50*	22.51*	43.94*	69.48*

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}20 = 311$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}10$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

on each subtest for sex and location groups; Table 38 summarizes results of analysis of variance tests on the means (for standard deviations, see Table 82, Appendix D). Day class girls and total girls scored significantly higher than boys in the comparable groups on Paragraph Meaning, Word Meaning, and Spelling. Sex differences for institutionalized subjects were not significant. Day class girls and total day class subjects scored significantly higher than institutionalized counterparts on all five subtests, with one exception. A location effect for total groups on Paragraph Meaning was not existent. Day class boys scored significantly higher than institutionalized boys only on Spelling, Arithmetic Reasoning, and Arithmetic Computation.

Table 83, Appendix D, gives grade scores equivalent to raw scores on each subtest. Grade scores for means of all subjects combined are: Paragraph Meaning, 2.8; Word Meaning, 2.8; Spelling, 2.5; Arithmetic Reasoning, 2.7; and Arithmetic Computation, 2.8. Lowest and highest equivalent grade scores were obtained on arithmetic subtests. On Arithmetic Reasoning, institutionalized girls had a mean raw score approximately equal to a grade score of 2.1. On Arithmetic Computation, day class girls had a mean raw score equal to a grade score of 3.3.

Of interest is the relation between achievement test scores and intelligence. Table 39 gives coefficients of correlation between WISC FS IQs and scores on each Stanford subtest. All coefficients differ significantly from zero. For all subjects combined, coefficients obtained with arithmetic subtest scores are highest (.700 and .684); those with reading scores, next highest (.572 and .506); and that with the spelling score, lowest (.428).

Table 40 gives intercorrelations between pairs of subtest scores for all subjects combined (for subgroup correlations, see Tables 84 through 91, Appendix D). Again, all coefficients differ significantly from zero. The highest was obtained by comparing scores on reading subtests (.901); the next highest, by comparing scores on arithmetic subtests (.831). The three lowest

—which are actually quite high—were obtained by comparing scores on reading and spelling subtests with the score on Arithmetic Computation (Spelling is the only subtest that does not directly require some reading ability).

Availability of Special Classes

Investigators wanted to learn whether availability of special classes for educable retarded children helps determine the proportion of their total child population a community sends to the Owatonna State School. The investigators had planned to compare the proportion of Minnesota's total child population from communities without special classes with the proportion of Owatonna residents from the same communities.

TABLE 39

Correlation Coefficients of WISC Full-Scale IQs with Stanford Achievement Subtest Scores by Sex and Location of Subjects

		Measure				
Group	*N*	PM	WM	S	AR	AC
Day class						
Boys	105	.440	.328	.267	.631	.654
Girls	68	.706	.614	.386	.702	.640
Institutionalized						
Boys	102	.598	.561	.530	.747	.785
Girls	56	.610	.643	.550	.770	.653
Boys total	207	.517	.440	.412	.686	.717
Girls total	124	.666	.625	.459	.728	.628
Day class total	173	.549	.441	.311	.657	.645
Institutionalized total	158	.602	.586	.539	.753	.739
Grand total	331	.572	.506	.428	.700	.684

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are *N*-6 for day class and institutionalized subgroups, *N*-11 for total sex and location groups, and *N*-21 = 310 for the grand total of subjects. *All coefficients are significantly different from zero at a probability of .01 or less.*

TABLE 40

Intercorrelations of Stanford Achievement Subtest Scores for 331 Day Class and Institutionalized Subjects

	Measure			
Measure	WM	S	AR	AC
PM	.901	.807	.745	.679
WM		.822	.705	.648
S			.703	.658
AR				.831

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are *N*-21 = 310. All coefficients are significantly different from zero at a probability of .01 or less.

It became apparent, however, that a high proportion of Owatonna residents came from large cities. These are the communities which have had special classes for many years. Therefore, it was clear that presence of special classes does not indicate a low referral to the Owatonna school.

There remained the possibility that Owatonna residents from communities with special classes might have some different characteristics than residents from communities without classes. Communities without classes might tend to use the Owatonna school as a general resource for the education of retardates, while communities with classes might refer to Owatonna only children who, for some reason, "fall out" of special class programs.

To study this possibility, investigators classified each Owatonna resident according to whether or not, at the time of referral to Owatonna, he came from a community with special classes. By comparing mean scores on the WISC Full Scale, the Stanford Achievement subtests, the Behavior Rating Scale, and the Adjective Checklist, investigators learned whether subjects from either type of community had higher IQs, higher levels of achievement, or more favorable behavior characteristics.

Of the 158 institutionalized subjects, 71 came from communities with special classes, and 87 came from communities without classes. Table 41 gives percentages of boys, girls, and total institutionalized subjects from each kind of community. *Chi*-square test results show that equal proportions of each sex—roughly, 45%—came from communities with special classes.

For sex and availability groups, Table 42 gives mean scores on the WISC Full Scale, the Behavior Rating Scale, the total Adjective Checklist, and the Stanford Achievement subtests. Table 43, which summarizes results of analysis of variance tests on the means, shows that means for groups with and without special classes available did not differ significantly from each other. Therefore, the availability of a special class had no apparent effect on the intelligence, achievement level, or behavior characteristics of Owatonna residents.

However, differences in mean scores on the Behavior Rating Scale and Adjective Checklist did approach the level of significance. Investigators examined ratings on each item in these measures. They classified Key 1 items on the Adjective Checklist and categories 4 and 5 of each Behavior Rating Scale item as representative of desirable behavior. Tables 92 and 93, Appendix D, give

TABLE 41

Percentages of Institutionalized Boys and Girls from Communities with and without Special Classes for Educable Retarded Children

	Sex		
Special Class Available?	Boys ($N = 102$)	Girls ($N = 56$)	Total ($N = 158$)
	per cent	per cent	per cent
Yes	46.1	42.9	44.9
No	53.9	57.1	55.1
Total	100.0	100.0	100.0

Note.—*Chi*-square = 0.151; degrees of freedom = 1. Probability is between .50 and .70.

TABLE 42

Mean Scores on the WISC Full Scale, Behavior Rating Scale, Total Adjective Checklist, and Stanford Achievement Subtests for Institutionalized Subjects by Sex and Availability of Special Classes

		Measure							
Sex and Availability	*N*	WISC	Behavior Rating Scale	Adjective Checklist	PM	WM	S	AR	AC
Boys									
Yes	47	61.53	50.11	71.51	23.74	18.91	13.06	13.79	23.74
No	55	62.15	54.27	77.69	22.51	17.31	13.18	13.56	22.85
Girls									
Yes	24	52.33	51.08	76.96	21.42	17.96	14.33	10.71	17.25
No	32	52.63	53.84	83.81	26.25	21.28	17.09	12.53	22.66
Boys total	102	61.86	52.35	74.84	23.08	18.05	13.13	13.67	23.26
Girls total	56	52.50	52.66	80.87	24.18	19.86	15.91	11.75	20.34
Yes total	71	58.42	50.44	73.35	22.96	18.59	13.49	12.75	21.55
No total	87	58.64	54.11	79.94	23.89	18.77	14.62	13.18	22.78
Institutionalized total	158	58.54	52.46	76.98	23.47	18.69	14.11	12.99	22.23

Note.—Stanford achievement subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation.

TABLE 43

***F*-Test Results for Availability of Special Class Effects in the Analysis of Variance of Scores on the WISC Full Scale, Behavior Rating Scale, Total Adjective Checklist, and Stanford Achievement Subtests**

Measure	Sex Boys ($N = 102$)	 Girls ($N = 56$)	 Total ($N = 158$)
WISC	0.08	0.01	0.02
Behavior Rating Scale	4.1[illegible]	0.92	4.84
Adjective Checklist	2.33	2.45	4.66
PM	0.24	2.25	0.22
WM	0.66	1.81	0.01
S	0.01	1.46	0.66
AR	0.05	2.04	0.29
AC	0.12	2.29	0.35

Note.—Stanford achievement subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}10$ for boys and girls and $n_2 = N\text{-}20 = 138$ for the total group. None of the effects was significant at a probability of .01 or less.

percentages of subjects rated favorably on each item in the Behavior Rating Scale; Tables 94 and 95, Appendix D, give percentages of subjects rated as having each desirable trait in the Adjective Checklist. In Tables 92 and 94, breakdown is by sex; in Tables 93 and 95, by availability of special classes.

Percentages of the total group rated favorably on each Behavior Rating Scale item ranged from 28.5% to 87.3%. No significant sex differences were observed. No significant availability difference ($p < .01$) was observed. On every item, however, more subjects from communities *without* special classes were rated favorably than subjects from communities with classes.

At a probability level of .05 or less, subjects from communities without classes were considered to have six desirable characteristics on the Behavior Rating Scale significantly more often than other children. These characteristics are: (a) conformity to requests—general cooperativeness, (b) interest and progress in learning, (c) excessive conversation, (d) stability of activity level—degree of freedom from hyperactivity, (e) absence of anti-social behavior and fighting, and (f) ability to tolerate frustration.

Percentages of the total group rated on each item of the Adjective Checklist ranged from 1.9% to 75.9%. Only one item significantly differentiated the sexes ($p < .01$); only two, the availability groups ($p < .01$). With a few exceptions, girls were rated more favorably than boys, and students from communities without special classes were rated more favorably than students from communities with them.

Considering a probability of .05 as the critical significance level, 11 items differentiated the sex and availability groups—7 in each instance. Girls were rated significantly less often than boys as (a) annoying, (b) disobedient, and (c) irresponsible and significantly more often as (a) anxious to please, (b) cooperative, (c) courteous, and (d) no discipline problem. Subjects from communities with special classes were rated significantly more often than others as (a) annoying, (b) defiant, (c) quick-tempered, and (d) unable to play with others; they were rated significantly less often as (a) anxious to please, (b) cooperative, and (c) well-behaved.

In summary, subjects from communities with special classes generally had less favorable behavior characteristics than subjects from communities without classes. The two groups did not have different levels of intelligence or academic achievement.

PART TWO—RETEST GROUP

Intellectual and Personality Characteristics

Before examining retest scores on the Stanford Achievement Test, investigators determined whether conclusions for the total group of 331 subjects held true for the retest group of 177. First they determined sex and location effects on intelligence and personality.

For sex and location groups, Table 44 gives retest subjects' mean WISC FS IQs, Behavior Rating Scale scores, and total Adjective Checklist scores. Table 45 gives results of analysis of variance tests on the means (for standard deviations, see Table 96, Appendix D). Sizes of the means are different, but conclusions on intelligence and personality of the total 331 subjects held true for the retest group.

Among retest subjects, institutionalized boys and total boys had significantly higher mean IQs than female counterparts. Day class boys and girls, considered separately or combined, had significantly higher mean IQs than institutionalized counterparts.

TABLE 44

Means of WISC Full-Scale IQs, Behavior Rating Scale Scores, and Total Adjective Checklist Scores by Sex and Location of Retest Subjects

		Measure		
Group	*N*	WISC	Behavior Rating Scale	Adjective Checklist
Day class				
Boys	67	71.81	46.72	65.90
Girls	41	67.41	46.59	67.78
Institutionalized				
Boys	42	62.17	54.33	77.00
Girls	27	53.22	53.70	79.04
Boys total	109	68.09	49.65	70.17
Girls total	68	61.78	49.41	72.25
Day class total	108	70.14	46.67	66.61
Institutionalized total	69	58.67	54.09	77.80
Grand total	177	65.67	49.56	70.97

No sex differences were observed for scores on the Behavior Rating Scale and Adjective Checklist. With regard to location differences, institutionalized boys and girls, considered separately or combined, were rated significantly more favorably than day class counterparts on the Behavior Rating Scale.

TABLE 45

F-Test Results for Sex and Location Effects in the Analysis of Variance of WISC Full-Scale IQs, Behavior Rating Scale Scores, and Total Adjective Checklist Scores for Retest Subjects

		Measure		
Comparison and Group	*N*	WISC	Behavior Rating Scale	Adjective Checklist
Sex				
Day class	108	3.82	0.01	0.31
Institutionalized	69	10.31*	0.05	0.17
Total	177	13.04*	0.02	0.54
Location				
Boys	109	16.40*	14.35*	9.48*
Girls	68	33.59*	7.67*	6.39
Total	177	43.30*	21.96*	15.92*

Note.—Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}12 = 165$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}6$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

TABLE 46

Intercorrelations of WISC Full-Scale IQs, Behavior Rating Scale Scores, and Total Adjective Checklist Scores by Sex and Location of Retest Subjects

		Intercorrelation		
Group	*N*	WISC-Behavior Rating Scale	WISC-Adjective Checklist	Behavior Rating Scale-Adjective Checklist
Day class				
Boys	67	.287	.054	.677*
Girls	41	.433*	−.233	.436*
Institutionalized				
Boys	42	.146	.086	.835*
Girls	27	.591*	.394	.793*
Boys total	109	.230	.068	.746*
Girls total	68	.491*	.004	.606*
Day class total	108	.333*	−.045	.590*
Institutionalized total	69	.293	.176	.813*
Grand total	177	.315*	.047	.693*

Note.—Degrees of freedom associated with each coefficient are *N*-4 for day class and institutionalized subgroups, *N*-7 for total sex and location groups, and *N*-13 = 164 for the grand total of subjects. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

Institutionalized subjects also had more favorable ratings on the Adjective Checklist, although differences were not significant for girls.

Table 46 gives correlations for sex and location groups between scores on the WISC, the Behavior Rating Scale, and the Adjective Checklist. For all subjects combined, Behavior Rating Scale scores were significantly related to both Adjective Checklist scores (r=.693) and WISC FS IQs (r=.315). The relation to WISC FS IQs was not observed for all 331 subjects. No correlation between the WISC and Adjective Checklist differed significantly from zero.

Initial, Final, and Gain Achievement

Table 47 gives mean scores on initial Stanford achievement subtests for retest subjects; breakdown is by sex and location. Table 48 gives results of analysis of variance tests on the means (for standard deviations, see Table 97, Appendix D). Mean values were generally lower for the retest group than the original group of 331, since the original group contained subjects with a wider age range. However, if means for the retest group were ranked, they would fall in about the same order as means for the other group.

In the day class group of retest subjects, girls scored significantly higher than boys on Paragraph Meaning, Word Meaning, and Spelling. In the institutionalized group, no significant sex differences were observed. In the total group, girls scored significantly higher than boys on Word Meaning and Spelling.

All location differences favored day class subjects. Day class boys scored significantly higher than institutionalized boys on Arithmetic Reasoning and Arithmetic Computation; day class girls scored significantly higher than institutionalized girls on all five subtests. Day class boys and girls combined scored significantly higher on all subtests except Paragraph Meaning.

TABLE 47

Means of Initial Stanford Achievement Subtest Scores by Sex and Location of Retest Subjects

Group	*N*	Measure				
		PM	WM	S	AR	AC
Day class						
Boys	67	21.10	18.04	13.85	14.99	29.51
Girls	41	28.61	24.85	21.56	16.59	34.66
Institutionalized						
Boys	42	19.71	14.14	10.10	12.19	20.64
Girls	27	19.52	15.93	12.26	9.56	14.70
Boys total	109	20.57	16.54	12.40	13.91	26.09
Girls total	68	25.00	21.31	17.87	13.79	26.74
Day class total	108	23.95	20.63	16.78	15.59	31.46
Institutionalized total	69	19.64	14.84	10.94	11.16	18.32
Grand total	177	22.27	18.37	14.50	13.86	26.34

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation.

For all retest subjects combined, grade score equivalents of initial subtest scores were: Paragraph Meaning, 2.6; Word Meaning, 2.5; Spelling, 2.4; Arithmetic Reasoning, 2.5; and Arithmetic Computation, 2.7.

Table 49 gives final mean achievement scores. Table 50 summarizes results of analysis of variance tests for sex and location differences (for standard deviations, see Table 98, Appendix D).

Day class girls scored significantly higher than day class boys on Word Meaning. Both day class girls and total girls scored higher than boys on Spelling. Means of day class girls and boys, separately and combined, were

TABLE 48

F-Test Results for Sex and Location Effects in the Analysis of Variance of Initial Stanford Achievement Subtest Scores for Retest Subjects

Comparison and Group	*N*	Measure PM	WM	S	AR	AC
Sex						
Day class	108	11.45*	14.48*	25.60*	3.07	6.42
Institutionalized	69	<0.01	0.61	1.05	4.31	3.72
Total	177	6.11	11.43*	19.41*	0.02	0.14
Location						
Boys	109	0.36	4.35	5.24	7.57*	14.30*
Girls	68	10.63*	18.12*	25.19*	45.77*	67.94*
Total	177	5.83	16.95*	22.26*	35.62*	58.45*

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are $n_2 = N\text{-}12 = 165$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}6$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

TABLE 49

Means of Final Stanford Achievement Subtest Scores by Sex and Location of Retest Subjects

Group	*N*	Measure PM	WM	S	AR	AC
Day class						
Boys	67	28.55	23.82	18.87	17.73	34.55
Girls	41	33.22	28.37	23.17	18.78	37.41
Institutionalized						
Boys	42	23.48	18.26	13.26	14.14	24.38
Girls	27	24.07	19.96	15.59	12.78	19.15
Boys total	109	26.60	21.68	16.71	16.35	30.63
Girls total	68	29.59	25.03	20.16	16.40	30.16
Day class total	108	30.32	25.55	20.50	18.13	35.64
Institutionalized total	69	23.71	18.93	14.17	13.61	22.33
Grand total	177	27.75	22.97	18.03	16.37	30.45

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation.

significantly higher than means of institutionalized counterparts with one exception: the difference favoring day class boys on Paragraph Meaning was not significant.

For all retest subjects combined, grade score equivalents of final subtest scores were: Paragraph Meaning, 3.0; Word Meaning, 2.9; Spelling, 2.7; Arithmetic Reasoning, 3.0; and Arithmetic Computation, 2.9. Investigators subtracted from these equivalents those for initial achievement to obtain amounts of gain during the 16 months between initial and final tests. Grade

TABLE 50

F-Test Results for Sex and Location Effects in the Analysis of Variance of Final Stanford Achievement Subtest Scores of Retest Subjects

		Measure				
Comparison and Group	*N*	PM	WM	S	AR	AC
Sex						
Day class	108	4.21	7.59*	8.73*	1.30	1.97
Institutionalized	69	0.04	0.57	1.15	1.09	2.85
Total	177	2.61	6.31	7.92*	<0.01	0.07
Location						
Boys	109	4.51	9.75*	11.66*	12.53*	20.42*
Girls	68	9.90*	18.43*	17.82*	29.16*	46.41*
Total	177	12.81*	24.75*	26.70*	35.68*	59.34*

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}12 = 165$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}6$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

TABLE 51

Means of Stanford Achievement Subtest Gain Scores by Sex and Location of Retest Subjects

		Measure				
Group	*N*	PM	WM	S	AR	AC
Day class						
Boys	67	7.45	5.78	5.01	2.75	5.04
Girls	41	4.61	3.51	1.61	2.20	2.76
Institutionalized						
Boys	42	3.76	4.12	3.17	1.95	3.74
Girls	27	4.56	4.04	3.33	3.22	4.44
Boys total	109	6.03	5.14	4.30	2.44	4.54
Girls total	68	4.59	3.72	2.29	2.60	3.43
Day class total	108	6.37	4.92	3.72	2.54	4.18
Institutionalized total	69	4.07	4.09	3.23	2.45	4.01
Grand total	177	5.47	4.59	3.53	2.50	4.11

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation.

score gains were: Paragraph Meaning, .4; Word Meaning, .4; Spelling, .3; Arithmetic Reasoning, .5; and Arithmetic Computation, .2.

Table 51 gives mean raw gain scores for sex and location groups (for standard deviations, see Table 99, Appendix D). Table 52 gives results of analysis of variance significance tests on the mean gains. Every mean gain score differed significantly from zero. Table 53 summarizes results of analysis

TABLE 52

F-Test Results for Significance of Mean Stanford Achievement Gain Scores by Sex and Location of Retest Subjects

Group	*N*	Measure				
		PM	WM	S	AR	AC
Day class						
Boys	67	77.47	72.51	93.96	35.24	45.71
Girls	41	15.32	22.79	8.01	32.17	8.59
Institutionalized						
Boys	42	13.25	27.19	46.68	14.40	12.20
Girls	27	30.92	28.19	22.24	47.86	9.89
Boys total	109	84.64	97.93	138.60	49.49	54.31
Girls total	68	34.19	46.93	26.81	76.39	18.53
Day class total	108	85.46	94.56	92.41	61.60	51.02
Institutionalized total	69	33.01	51.98	67.21	45.43	22.10
Grand total	177	118.05	146.25	156.47	106.05	71.24

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are: $n_1 = 1$ and $n_2 = N\text{-}3$ for day class and institutionalized subgroups, $n_2 = N\text{-}6$ for total sex and location groups, and $n_2 = N\text{-}12 = 165$ for the grand total of subjects. All achievement gains are significant at a probability of .01 or less.

TABLE 53

F-Test Results for Sex and Location Effects in the Analysis of Variance of Stanford Achievement Subtest Gain Scores of Retest Subjects

Comparison and Group	*N*	Measure				
		PM	WM	S	AR	AC
Sex						
Day class	108	3.99	4.72	18.21*	0.68	3.61
Institutionalized	69	0.30	0.01	0.04	2.91	0.16
Total	177	1.93	3.29	11.98*	0.11	1.24
Location						
Boys	109	7.50*	2.44	6.06	1.24	1.06
Girls	68	<0.01	0.23	3.62	2.85	1.08
Total	177	4.95	1.13	0.72	0.03	0.03

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}12 = 165$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}6$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

of variance tests that compared sex and location groups for differentiated amounts of gain.

No significant sex or location differences were observed for three subtests—Word Meaning, Arithmetic Reasoning, and Arithmetic Computation. However, day class boys made a significantly higher mean gain than institutionalized boys on Paragraph Meaning, and both day class boys and total boys made a significantly higher mean gain on Spelling than girls in the comparable groups.

Analysis of Covariance of Gains

Finding few significant differences in mean achievement gains did not enable the investigators to draw immediate conclusions. First they had to statistically equate subject groups in intelligence, behavior characteristics, and achievement, so these factors would not influence gain findings.

Table 54 gives coefficients of the correlation between initial, final, and gain achievement scores and scores on the WISC Full Scale, Behavior Rating Scale, total Adjective Checklist, and initial Stanford Achievement subtests. Correlations are for all subjects combined (for subgroup correlations, see Tables 100 through 107, Appendix D).

TABLE 54

Correlation Coefficients of Initial, Final, and Gain Achievement Scores with Scores on the WISC Full Scale, Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtests for 177 Day Class and Institutionalized Retest Subjects

	Measure				
Correlation	PM	WM	S	AR	AC
WISC-					
Initial	.576*	.501*	.436*	.681*	.685*
Final	.558*	.525*	.443*	.727*	.705*
Gain	.001	−.006	.005	.089	.040
Behavior Rating Scale-					
Initial	.160	.218*	.205*	.244*	.255*
Final	.241*	.279*	.253*	.350*	.294*
Gain	.154	.083	.097	.168	.070
Adjective Checklist-					
Initial	.047	.115	.196	.073	.119
Final	.127	.166	.220*	.195	132
Gain	.145	.076	.046	.188	.023
Initial-					
Final	.839*	.839*	.889*	.779*	.832*
Gain	−.230*	−.372*	−.255*	−.307*	−.283*

Note.—Stanford achievement subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are *N*-13 = 164. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

WISC-initial achievement coefficients are essentially the same as those calculated for all 331 subjects combined.

WISC IQs were positively and significantly related to initial and final achievement scores on each of the five subtests. Behavior Rating Scale scores were positively and significantly related to all initial and final achievement scores except the initial score on Paragraph Meaning. Total Adjective Checklist scores were positively and significantly related only to final achievement in Spelling.

Coefficients of correlation between initial and final achievement on each subtest were positive and significantly different from zero. Ranging from .779 to .889, they represented a fairly high test-retest reliability, considering the time lapse between testings.

Achievement gain scores were not found significantly related to WISC FS IQs, Behavior Rating Scale scores, or total Adjective Checklist scores. These gain scores were significantly, but negatively, related to initial achievement scores. Initial-gain correlation coefficients ranged from —.230 to —.372.

Because only initial achievement scores were significantly related to achievement gain scores, they were the only scores controlled in the analysis of covariance. Table 55 summarizes results of this analysis. The table shows that sex did not affect the amount of gain when the level of initial achievement was statistically controlled. On no subtest were there significant mean adjusted gain differences between boys and girls.

For girls, no location differences between mean achievement gains were significant. For boys, location differences were significant for two subtests. Day class boys gained significantly more than institutionalized boys on Paragraph Meaning and Spelling, even though day class boys had higher initial mean scores on these subtests. Day class boys and girls combined had signifi-

TABLE 55

F-Test Results for Sex and Location Effects in the Analysis of Covariance of Stanford Achievement Subtest Gain Scores Controlling Initial Achievement Scores of Retest Subjects

		Measure				
Comparison and Group	*N*	PM	WM	S	AR	AC
Sex						
Day class	108	1.07	0.35	5.75	0.05	1.37
Institutionalized	69	0.29	0.02	0.10	1.43	0.01
Total	177	0.68	0.34	5.19	0.08	1.09
Location						
Boys	109	8.69*	5.54	8.85*	4.59	5.34
Girls	68	0.46	1.20	0.10	0.17	0.06
Total	177	7.83*	7.04*	3.95	3.64	4.30

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each test are $n_1 = 1$ and $n_2 = N\text{-}13 = 164$ for total groups and $n_1 = 1$ and $n_2 = N\text{-}7$ for other groups. Asterisk (*) indicates a significant effect at a probability of .01 or less.

cantly higher mean adjusted gains than institutionalized subjects on Paragraph Meaning and Word Meaning, the two reading subtests.

In summary, when the level of initial achievement was controlled, investigators found an apparent interaction of sex and location. Day class girls did not have adjusted mean gains significantly different from those of institutionalized girls. Day class boys gained significantly more than institutionalized boys on Spelling and one reading subtest, Paragraph Meaning. No location differences were observed for gains on the two arithmetic subtests, Arithmetic Reasoning and Arithmetic Computation.

Amounts of adjusted gain showed no significant sex differences for either day class or institutionalized subjects. In short, when initial achievement was controlled, sex alone had no significant effect.

CHAPTER 7

Summary, Conclusions, and Implications

THE STUDY IN REVIEW

This study had two major objectives: (a) to provide improved means for predicting the adult status of educable retarded children and (b) to contrast conditions associated with education and care of these children in institutions and public school classes.

Special class facilities for educable retardates are increasing rapidly in local communities. More and more often it is necessary to decide whether a special class or an institution will best suit the needs of an individual child and society. In making this decision, investigators consider many factors besides intelligence. Most stress the importance of conditions at home. However, no one has yet constructed objective criteria or predictive devices to tie suggestions of investigators to behavior. This project represents one attempt to do so.

The Predictive Study

To accomplish the first major objective of this project, investigators made an intensive retrospective study of dischargees of the Owatonna State School in Minnesota, a residential school for educable retarded children. Investigators studied 500 children, all those discharged through January, 1955, during the school's first nine and one-half years of operation.

In July, 1957, 161 of the dischargees were living in Minnesota communities under supervision of county welfare boards, 183 were in institutions throughout the state, and 65 had been discharged from guardianship. The other 91 had either moved out of state or were "lost" for other reasons.

For each of the 409 dischargees who were not "lost," investigators collected the kind of biographical data available before institutionalization. They collected further information with a questionnaire designed to investigate important facets of adjustment after leaving Owatonna. Two forms of the questionnaire were used: one for institutionalized wards and another for wards living in communities under supervision. Follow-up data were not obtained on subjects discharged from guardianship.

Investigators classified the 161 community and 65 discharged subjects "successful" and the 183 institutionalized subjects "unsuccessful." Using these classifications as a criterion, they found three biographical factors significantly related ($p<.01$) to follow-up status: (a) presence of a physical defect, (b) IQ at admittance to Owatonna, and (c) admittance age.

At the time of admittance, 43% of discharged subjects, 54% of community subjects, and 72% of institutionalized subjects had some physical defect. The presence of a defect, therefore, was negatively related to the criterion for success. Investigators observed a point-biserial correlation of $-.216$ between the two variables.

Mean admittance IQs for discharged, community, and institutionalized subjects were 65, 61, and 57, respectively. Mean admittance ages for the respective groups were 15.1, 14.8, and 13.9 years. The point-biserial coefficient of the correlation between criterion classifications and admittance IQ was +.306; between criterion classifications and admittance age, +.166. Average length of stay at Owatonna was 3.7 years. Mean age of all 409 subjects at the time of the follow-up study was 25.1 years. The follow-up study was conducted on an average of seven years after discharge from Owatonna.

Both forms of the follow-up questionnaire included a total adjustment item as well as items on specific areas of adjustment. On the basis of the total adjustment item, subjects in institutions and communities were classified "good" or "poor." *Chi*-square values for independence of classification showed which items of specific adjustment were related to total adjustment. Contingency coefficients showed the strength of significant relations.

All but 3 of the 11 items on the community questionnaire differentiated good and poor adjustment groups. Not related to total adjustment were marital status, economic self-sufficiency, and physical handicaps affecting employment or employability. Only 1 of the 11 items on the institutional questionnaire was not significantly related to total adjustment. That item was physical condition.

Community items were arranged into four groups according to contingency coefficients indicating relatedness to total adjustment. The first group contained items most related; the fourth, items not related at all. The first group contained (a) social relations and (b) ability to manage funds; the second, (a) supervision (non-employment) quality, (b) participation in social activities, and (c) cooperation with welfare board; the third, (a) personal hygiene, (b) sexual adjustment, and (c) law violations.

Coefficients for institutional items covered a wider statistical range. Items most highly related to total adjustment were (a) relations with associates and (b) cooperation with staff. Moderately related were (a) supervision required, (b) mental disturbance, (c) quality of work performance, and (d) responsibility of work. Slightly related were (a) sexual adjustment, (b) interest in social activities, (c) economic prognosis, and (d) runaway frequency.

Ability to relate to other persons, shown highly related on both questionnaires, is apparently the factor social workers rely on most when judging total adjustment. Whether the retardate lives in the community or an institution, they place little or no weight on his capacity, present or future, to be economically self-sufficient.

Investigators decided to determine whether an equation using the three related factors as independent variables could reliably predict success. The 409 subjects were randomly divided into two samples. A discriminant equation was developed for each sample; it was checked in the other sample. Within sexes and samples, values calculated for each of the two equations were correlated with each other. A coefficient of .945 resulted from pooling within sums of deviation squares and products for both sexes and samples.

Since the equivalent-forms reliability was so high, investigators made further analyses only with a discriminant function equation for both samples combined:

$$Y_T = -18.91\,X_1 + 1.920\,X_2 + 0.2458\,X_3$$

In this equation, X_1, either 1 or 0, represents the presence or absence of a physical defect; X_2, the admittance IQ; and X_3, the admittance age in months. A subject was classified successful only if his Y value was greater than the critical value of 144.9.

When comparing criterion classifications with classifications by the discriminant function, investigators obtained a *phi* coefficient of .365. Of the 226 subjects classified successful according to the criterion, the discriminant function correctly classified 69.4%; of the 183 subjects classified unsuccessful, the discriminant function correctly classified 67.2%.

Teacher and houseparent ratings on 107 of the 409 subjects were obtained with an Adjective Checklist. The checklist contains words and phrases descriptive of subject behavior. It consists of three keys: Key 1 items indicate positive qualities; Key 2 items, difficulty in getting along with others; Key 3 items, symptoms of personal maladjustment. Scores were obtained for each key. A weighted total score was calculated with this formula:

$$50 + 3(\text{Key } 1) - (\text{Key } 2) - (\text{Key } 3)$$

Teachers and houseparents checked a significantly different mean number of Key 2 items for each subject, although significant differences for other keys were not observed. The total score was deemed most reliable. The coefficient of correlation between the two types of raters' scores was +.537. With the exception of teacher ratings on Key 2, means for successful and unsuccessful subjects, classified by the criterion, differed significantly on all three keys and the total key whether teacher and houseparent ratings were considered separately or combined.

According to criterion classifications, 64 of the 107 subjects were successful at the time of the follow-up study; 43 were unsuccessful. Groups were compared for correct classification by dichotomous methods using the discriminant function and total Adjective Checklist score, when ratings were made by teachers, houseparents, and all raters combined. Combined teacher-houseparent ratings were related most strongly to criterion classifications.

Classifications by the discriminant function were independent of classifications by the Adjective Checklist. Future investigators, therefore, may find it worthwhile to attempt prediction with a combination of the methods.

The Comparative Study

The comparative study was designed to specify conditions associated with institutional versus community care and education of educable retarded children. Investigators contrasted two samples of pupils chosen in the fall of 1957—a community sample from special public school day classes and an institutionalized sample from the Owatonna State School. The community sample consisted of 105 boys and 68 girls. The institutionalized sample consisted of 102 boys and 56 girls. All had birth years between 1942 and 1946, inclusive.

With the Stanford Achievement Test (Primary Battery, Form J), investigators obtained initial achievement scores in reading, spelling, and arithmetic for each pupil. They used the Wechsler Intelligence Scale for Children

(WISC) to obtain IQ scores. They obtained ratings on behavior characteristics with the Adjective Checklist and a Behavior Rating Scale.

The Behavior Rating Scale was designed to determine a child's basal level of behavior. It contains 14 items. Under each, a child is checked as having one or more of five behavior characteristics. Scores of 1 through 5 are assigned to the characteristics, and a total score is obtained by summation over the 14 items. For the comparative study, both the Adjective Checklist and the Behavior Rating Scale were checked by teachers.

Subjects were retested with the achievement test 16 months after initial testing. Because some of the 331 subjects had dropped out of school by retest time, the retest sample included only subjects born in 1944, 1945, or 1946. Almost 100% (177 of 178) of these subjects were retested.

Investigators removed year differences within sex and location groups (subjects were *located* in the institution or a community) before computing correlation coefficients between various scores and testing mean differences with the analysis of variance. They studied sex and location differences in intelligence, personality, and initial achievement for all 331 subjects and for the 177 retest subjects. Because results for each group were similar, only those for retest subjects will be summarized at this time.

Institutionalized boys and total boys had significantly higher mean admittance IQs than girls in comparable groups. Total boys had a mean IQ of 68.1; total girls, 61.8. Day class boys and girls, considered separately and combined, had significantly higher admittance IQs than institutionalized counterparts. Total day class subjects had a mean IQ of 70.1; total institutionalized subjects, 58.7.

No significant sex differences were observed in mean scores on the Behavior Rating Scale or Adjective Checklist. However, institutionalized girls scored significantly higher than day class girls on the total Adjective Checklist, and institutionalized boys and girls, separately and combined, scored significantly higher than day class counterparts on the Behavior Rating Scale. Total day class subjects had a mean Adjective Checklist score of 66.6 and a mean Behavior Rating Scale score of 46.7. Total institutionalized subjects had a mean Adjective Checklist score of 77.8 and a mean Behavior Rating Scale score of 54.1.

Investigators found that significant differences in initial and retest achievement scores fell in essentially the same pattern. Differences for only retest scores will be summarized below.

Retest scores for boys and girls differed significantly on two subtests. Day class girls scored significantly higher than day class boys on Word Meaning. Both day class girls and total girls scored higher than boys in comparable groups on Spelling. With one exception, day class boys and girls, separately and combined, scored significantly higher than institutionalized counterparts on all subtests. The exception was for day class boys on Paragraph Meaning.

For all retest subjects combined, means of final achievement scores, when roughly equated to grade scores, were: Paragraph Meaning, 3.0; Word Meaning, 2.9; Spelling, 2.7; Arithmetic Reasoning, 3.0; and Arithmetic Computation, 2.9. During the 16 months between initial and final testing, amounts of gain ranged from two to five months or the following number of grade points: Paragraph Meaning, .4; Word Meaning, .4; Spelling, .3; Arithmetic Reasoning, .5; and Arithmetic Computation, .2.

For all sex and location groups, separately and in combination, each mean gain differed significantly from zero. Neither sex nor location differences in mean gains occurred for three subtests—Word Meaning, Arithmetic Reasoning, and Arithmetic Computation. On Paragraph Meaning, day class boys gained significantly more than institutionalized boys; on Spelling, day class boys and total boys gained significantly more than girls in comparable groups.

Since the difference between initial achievement, personality, and intelligence measures could have masked or enhanced sex or location effects of achievement gains, scores on these measures were correlated with initial, final, and gain scores on the achievement subtests. No significant relations between WISC IQs and achievement gains were observed. Coefficients of total Adjective Checklist and Behavior Rating Scale scores with gain achievement scores were not significant.

The high positive correlations (.779 to .889) between initial and final achievement on each subtest differed significantly from zero. They indicated satisfactory test-retest reliability.

Because gain scores were not related to scores on the WISC and personality measures, it was deemed unnecessary to statistically equate groups on these variables through analysis of covariance. However, gain achievement scores on each subtest were significantly, but negatively, related to corresponding initial achievement scores. Correlation coefficients ranged from −.230 to −.372. Therefore, after adjustment was made for initial achievement, analyses of covariance were carried out on gain scores.

No subtest showed significant sex differences in mean adjusted gain scores when initial level of achievement was statistically controlled. No subtest for girls showed a significant location difference, although day class boys gained significantly more than institutionalized boys on Paragraph Meaning and Spelling. Total day class subjects had significantly higher mean adjusted gains than institutionalized subjects on the reading subtests, Paragraph Meaning and Word Meaning. No significant location differences appeared for the arithmetic subtests, Arithmetic Reasoning and Arithmetic Computation.

CONCLUSIONS AND IMPLICATIONS

The Predictive Study

Of subjects in the predictive study, most former residents of the Owatonna State School (55%) made an acceptable community adjustment, according to ratings made an average of seven years after discharge. The remaining 45% continued to be institutionalized.

Obviously, it would be desirable if the proportion of unsuccessful persons —those who continue in institutions—could be decreased. Investigators in the present study searched for characteristics to aid the early identification of potentially unsuccessful persons.

They found that several factors sometimes thought to distinguish these persons did not yield useful predictions. Among the factors were: (a) sex,

(b) stability of home situations in early life, (c) type of retardation (familial vs. non-familial), and (d) history of delinquency.

Several other factors were predictive of long-range adjustment. The unsuccessful were distinguished by (a) relatively low IQ, (b) early age of institutionalization, and (c) presence of secondary handicaps (such as sensory defects, speech defects, etc., even of minor degree). Their most distinguishing characteristics emerged from personality ratings made by teachers and houseparents on an Adjective Checklist.

Since these "dynamic" characteristics were independent of such "static" factors as IQ and age at institutionalization, there is good promise that studies involving a combination of the two types of factors may be useful in long-range prediction.

Owatonna residents from communities without special classes for the retarded did not differ from other residents in IQ or academic achievement. However, they did differ in certain personality characteristics. Communities with special classes tended to send to Owatonna the residents who were most non-conforming, hyperactive, and uninterested in learning.

Since special classes for the retarded are increasing rapidly, even in small communities, one may expect that the Owatonna population will increasingly serve a selected group of "fallouts" from special classes, a very poorly adjusted, non-conforming group.

If the proportion of successful dischargees is to increase, the Owatonna school must concentrate on these fallouts. Least success was observed with children who came to the institution at early ages, had secondary defects, and presented complex problems of social and emotional maladjustment. The role of the Owatonna school, as a school, should not be minimized, but it appears that the institution's value may depend increasingly on changes in staff orientation, program, and facilities that focus on treatment of social and emotional problems and other secondary defects of the younger residents.

A combination of static and dynamic data seems most promising for differentiating educable retarded children if quality of long-range, post-institutional adjustment is the essential criterion of success. In the present study, instruments for portraying dynamic personal characteristics were developed and described. It is noteworthy that teacher and houseparent ratings on the Adjective Checklist could predict adjustment (community vs. institutional placement) at least as well as IQ and several other factors combined in a discriminant equation.

The Comparative Study

The comparative study of retardates in day classes and the Owatonna school revealed a number of important findings. Boys, who outnumbered girls in both settings, tended to have higher IQs than girls, but the sexes did not differ correspondingly in academic achievement. The tendency of retardates to score higher on performance than verbal measures of intellect was confirmed for boys, but not for girls.

Day class students tended to score higher than Owatonna residents in academic achievement, although when gain scores were adjusted for initial differences, day class students generally made no greater gains in achievement over a 16-month period. It appears that academic progress is generally as adequate in one setting as the other.

The large body of static and dynamic information collected on retardates should be useful in long-range longitudinal studies. Plans for such studies are under way. Because of the important sex differences this study reveals, it will be important to make separate analyses by sex. Another important consideration will be the adequacy of social work ratings as a criterion of success. In rating overall adjustment, social workers in the present study tended to give little weight to such factors as economic independence, a tendency that may suggest marked differences among several professions, or among individuals, in criterion orientation.

Appendix A

EXHIBIT A

Biographical Data Sheet
for Study of Institutionalized Mental Retardates

________	________	________	________	________
(1-5) File Number	(6-7) Birth Year	(8-9) Month	(10-11) Date	(12-14) Case Number

(15-16)________________County from which subject was committed to Owatonna:

01 Aitkin
02 Anoka
03 Becker
04 Beltrami
05 Benton
06 Big Stone
07 Blue Earth
08 Brown
09 Carlton
10 Carver
11 Cass
12 Chippewa
13 Chisago
14 Clay
15 Clearwater
16 Cook
17 Cottonwood
18 Crow Wing
19 Dakota
20 Dodge
21 Douglas
22 Faribault
23 Fillmore
24 Freeborn
25 Goodhue
26 Grant
27 Hennepin
28 Houston
29 Hubbard
30 Isanti
31 Itasca
32 Jackson
33 Kanabec
34 Kandiyohi
35 Kittson
36 Koochiching
37 Lac qui Parle
38 Lake
39 Lake of the Woods
40 Le Sueur
41 Lincoln
42 Lyon
43 McLeod
44 Mahnomen
45 Marshall
46 Martin
47 Meeker
48 Mille Lacs
49 Morrison
50 Mower
51 Murray
52 Nicollet
53 Nobles
54 Norman
55 Olmsted
56 Otter Tail
57 Pennington
58 Pine
59 Pipestone
60 Polk
61 Pope
62 Ramsey
63 Red Lake
64 Redwood
65 Renville
66 Rice
67 Rock
68 Roseau
69 St. Louis
70 Scott
71 Sherburne
72 Sibley
73 Stearns
74 Steele
75 Stevens
76 Swift
77 Todd
78 Traverse
79 Wabasha
80 Wadena
81 Waseca
82 Washington
83 Watonwan
84 Wilkin
85 Winona
86 Wright
87 Yellow Medicine

(17)________________Sex: 0. Female 1. Male

(18)________________Home community of subject: 0. Rural 1. Town 2. City

(19)________________Number of homes experienced by subject:
0. One 1. Two 2. Three 3. Four or more

(20)______________There is a record of mental deficiency in the subject's immediate family. 0. Yes 1. No

(21-23)____________The last IQ score available before admittance to Owatonna.

(24)______________IQ test administered: 0. S-B 1. K 2. W-B 3. Arthur

(25)______________The subject has a physical defect. 0. Yes 1. No (also mark "0," col. 26)

(26)______________The subject is suffering from a physical defect of the following
(multiple) nature: 0. None 1. Visual 2. Motor 3. Speech 4. Auditory

(27)______________The subject has been reported for delinquency. 0. Yes 2. No (also mark "0," col. 28)

(28)______________The subject has been reported for delinquency of the follow-
(multiple) ing type:

0. None
1. Theft
2. Truancy or runaways
3. Violence or destructiveness
4. Active sex delinquency
5. Passive sex delinquency

(29)______________The subject has appeared in court for these delinquencies. 0. Yes 1. No

(30)______________Number of admittances to Owatonna.

(31-33)____________Age (in months) of subject at first admittance to Owatonna.

(34-36)____________Age (in months) of subject at last discharge from Owatonna.

(37-39)____________Total number of months spent at Owatonna.

(40-42)____________Total number of months of previous institutionalization.

(43-45)____________Age (in months) of last follow-up adjustment survey previous to July 1, 1957.

(46-48)____________Total number of months between last discharge and last follow-up adjustment survey previous to July 1, 1957.

(49)______________The subject is considered to have made an adjustment described as (if subject was discharged between July, 1952, and February, 1955, and is categorized under col. 50; see SDS):

0. Category A
1. Category D
2. Category E
3. Category H
4. Category I
5. Category L
6. Category N
7. Category O
8. Category P
9. Category Q

(50)______________The subject is considered to have made an adjustment described as (if subject was discharged prior to July, 1952, and is listed in col. 49; see SDS):

1. Very satisfactory
2. Satisfactory
3. Doubtful
4. Unsatisfactory
5. Very unsatisfactory

(51-53)____________Age (in months) of subject at follow-up adjustment survey dated July 1, 1957.

(54-56)____________Total number of months between last discharge from Owatonna and follow-up adjustment survey dated July 1, 1957.

(57)______________The subject is considered to have made an adjustment described as:

EXHIBIT B

Directions for Coding Biographical Data

Col. No.

(1-5) State welfare commission file number.

(6-7) (8-9) (10-11) Year, month, and date of birth.

(12-14) Case number assigned to subject alphabetized by study groups, first one first.

(15-16) County from which subject was admitted to Owatonna. Write appropriate number in blank.

(17) Sex: Write appropriate figure in the blank after the column number.

(18) Community: Consider Minneapolis, St. Paul, and Duluth as "city," consider farm homes as "rural," and consider all others as "town."

(19) Home situations: An intact family group would be recorded as one home situation. If a subject's parents have separated or if one parent has died, record two home situations. If the surviving parent (or parent having custody) remarried, this would be a third home situation. Each boarding home placement, stay with relatives, or stay in orphanage would be counted as a different home situation.

(20) Family mental deficiency: Record as "yes" if (1) parents or siblings have been committed as feebleminded, or (2) if IQ scores of parents or siblings are below 80, or (3) if social worker estimates parents or siblings to be of low intelligence.

(21-23) (24) Self-explanatory.

(25) If the subject has no physical defect mark "no" and also "0" in column 26.

(26) If the subject suffers from more than one defect, record all the numbers which apply.

(27) If the subject has not been reported for delinquency mark "no" and also "0" in column 28.

(28) Record all the numbers of each type of delinquency for which the subject has been reported.

(29) If the subject has appeared in juvenile court for delinquency, record as "yes."

(30) Record the number of times the subject has been admitted to Owatonna.

(31-33) (34-36) (37-39) (40-42) (43-45) (46-48) Record to the nearest month. An excess of fifteen days is counted as a month.

(49) Use the following as a guide to adjustment:

Category A: Those who were transferred from Owatonna directly to another institution.

Category D: Those released from Owatonna, presently working, and at least partially supporting themselves.

Category E: Those who escaped from Owatonna to parents' or relatives' homes and are not supporting themselves (a relatively poor adjustment).

Category H: Those who were released from Owatonna to the community, but who were subsequently returned to institutional care.

Category I: Those released from Owatonna and later restored to capacity.

Category L: Those released from Owatonna, who held jobs in the community, at least partially supporting themselves, and who later entered the services.

Col. No.

Category N: Those removed from Owatonna at parents' insistence or through a legal technicality.

Category O: Those released from Owatonna for whom little or no information after release is available.

Category P: Those transferred to another institution, subsequently released, for whom little or no information is available.

Category Q: Those who, while vacationing from Owatonna, entered the service directly.

For those subjects in the second study group and listed in the five point category, mark and categorize in column 50.

(50) Use the following as a guide to recording adjustment:

Very satisfactory: The subject has been restored to capacity or such restoration is being considered.

Satisfactory: The subject has been working and at least partially supporting self and in no serious trouble; the subject is married (female) and in no serious trouble; the subject is getting along satisfactorily in some branch of the services.

Doubtful: Little information is available on the subject's adjustment since Owatonna; the subject has been removed at the parents' insistence.

Unsatisfactory: The subject has been released and later returned to institutional care; the subject is being considered for return to institutional care; the subject is living with parents or relatives but is not working or supporting self to any degree.

Very unsatisfactory: The subject was transferred to another institution for custodial reasons or as being unable to profit from further instruction at Owatonna or because no placement plans were being considered.

For those subjects in the first study group and listed in the ten point category mark and categorize in column 49.

(51-53) (54-56) Record to the nearest month. An excess of fifteen days is counted as a month.

EXHIBIT C

Revised Code for Biographical Data Sheet

Column 20 (multiple punch)

0	Familial mental deficiency diagnosed
1	Familial mental deficiency indicated
2	Neuropathic ancestry indicated
3,5	With developmental cranial anomalies
3,6	With congenital cerebral spastic infantile paralysis
3,7	Post-infectional
3,8	Post-traumatic
3,9	With epilepsy
4,5	With endocrine disorder
4,6	With other organic nervous diseases
4,7	With unspecified brain damage present
4,8	Type is unknown
R	Family jail record exists.

Column 25 (multiple punch)

0	None of the following
1	Orthopedic leg
2	Orthopedic arm
3	Orthopedic trunk
4	Unusually large size
5	Unusually small size
6	Vision

7 Hearing
8 Speech
9 General appearance defective

Column 26 (multiple punch)

0 None of the following
1 Coordination poor
2 Chronic organic diseases (diabetes, kidney, rheumatic fever, heart, psoriasis)
3 Congenital anomalies other than cranial
4 Allergies or asthma
5 Neurological (other organic nervous, non-specific brain damage, epilepsy)
6 Dental defects
7 "Fragile"

Column 27 (multiple punch)

0 Unknown (inadequate data)
1 Simple, slow: hypoactive, non-withdrawn
2 Hyperactive with temper tantrums
3 Delinquent: PD, theft, truancy, belligerent, etc.
4 Sex
5 Peculiar, schiz (withdrawn, odd, impulsive)
6 Violent agression
7 Hysterical personality

Column 57

0 Guardianship
1 Discharged and restored
2 Discharged
3 Restored
4 Discharged and lost
5 Discharged, out of state
6 Dead
7 Out of state or lost
8 Restored, null and void
9 In Armed Forces
x,0 Annex for Defective Delinquents
x,1 St. Cloud and YCC
x,2 Cambridge
x,3 Faribault
x,4 Owasso
x,5 Anoka
x,6 Hastings
x,7 Moose Lake
x,8 Rochester
x,9 St. Peter
y,0 Willmar
y,1 Gillette Hospital

Column 58

Those discharged and in the community:
1 Good
2 Fair
3 Marginal
4 Poor

Those currently in institutions:
5 Good
6 Fair
7 Poor

x unknown

Column 59-60

County of residence as reported on adjustment forms returned by the county. These are numbered alphabetically as in columns 15-16.

EXHIBIT D

Community Adjustment Form

Col. No.

(1-4) Name:______________________________ (5-9) County File No.____________
(10-14) DPW File No.____________
Date of last contact as shown in files of DPW:______________________

(15) Present whereabouts:
______1. In county of settlement ______3. In Armed Forces
______2. In another county (specify) ______4. Out of state or lost

(16) Marital status:
______1. Married ______3. Divorced
______2. Single ______4. Separated

(17) Is this ward a head of a household—responsible for support other dependents?
______1. Yes ______2. No

Col. No.

(18) Based upon the conduct of this ward for the last year (July, 1956-June, 1957) the total adjustment of this person has been:

______1. Good
______2. Fair
______3. Marginal
______4. Poor

Please check each of the specific criteria of adjustment below in a manner which you feel most closely corresponds to the behavior and activities of this person during the last year.

(19) Capacity for economic self-sufficiency:

______1. Fully self-supporting
______2. Marginally self-supporting
______3. Partially dependent
______4. Fully dependent

(20) Support of dependents:

______1. Fully supports
______2. Partially supports
______3. Offers no support

(21) Physical handicaps affecting employment or employability:

______1. No handicap
______2. Minor handicap
______3. Severe handicap
Specify type______________________________

(22) Ability to manage funds:

______1. Uses good judgment
______2. Occasionally uses poor judgment
______3. Usually uses poor judgment

(23) Social relationships with immediate family or others (e.g., boarding home, work home, etc.):

______1. Gets along well
______2. Has occasional difficulty
______3. Has considerable difficulty
______4. Complete discord

(24) Supervision by immediate family or others; e.g., boarding home (non-employment situation):

______1. Good
______2. Fair
______3. Poor
______4. None

(25) Social adjustment in leisure time activities (participates in community or church social activities):

______1. Regularly
______2. Occasionally
______3. Almost never

(26) Personal hygiene:

______1. Usually very well groomed
______2. Occasionally well groomed
______3. Usually slovenly and unclean

(27) Ward's cooperation with welfare board:

______1. Cooperative
______2. Indifferent
______3. Resistant or hostile

(28) Law violations:

______1. No violations
______2. One minor infraction
______3. Major or more than one minor infraction

(29) Sexual adjustment:
______1. No sexual adjustment problems
______2. Not abnormal but socially condemned such as
    ______3. Promiscuity   ______4. Masturbation
______5. Abnormal such as
    ______6. Homosexuality   ______7. Involvement with children
    ______8. Other perversions   ______9. Involvement with animals

Name of person preparing report______________________________

Title______________________________ Date____________

EXHIBIT E

Supplementary Code for Community Adjustment Form

Column 1

1 Male
2 Female

Column 2

0 Guardianship
1 Discharged and restored
2 Discharged
3 Restored
4 Discharged and lost
5 Discharged, out of state
6 Dead
7 Out of state or lost
8 Restored, null and void
9 In Armed Forces

Columns 3-4

County of settlement numbered alphabetically 01 Aitkin to 87 Yellow Medicine

Columns 30-31

County of residence; code same as columns 3-4.

EXHIBIT F

Institutional Adjustment Form

Col. No.
(1-4) Name:______________________________ (5-9) DPW File No.____________
(10) Relationships with associates:
______1. Gets along well   ______3. Has considerable difficulty
______2. Has occasional difficulty   ______4. Complete discord
(11) Cooperation with staff:
______1. Cooperative
______2. Indifferent
______3. Resistant or hostile
(12) Responsibility of work assignment:
______1. Considerable   ______3. Little
______2. Some   ______4. No work assignment
(13) Quality of performance in work assignment:
______1. Excellent   ______3. Fair
______2. Good   ______4. Poor
(14) Runaways:
______1. Frequent
______2. Occasional
______3. None

Col. No.

(15) Leisure time activities (interest in institutional social activities):
______1. Considerable
______2. Some
______3. Little or none

(16) Supervision required:
______1. Very little
______2. Some
______3. Considerable
______4. Complete

(17) Sex adjustment:
______1. Wholesome adjustment
______2. Occasional abnormal practices
______3. Serious and chronic abnormal practices

(18) Physical condition:
______1. Good
______2. Fair
______3. Poor

(19) Mental disturbance:
______1. None
______2. Infrequent
______3. Severe and chronic

(20) Based upon the conduct of this person while institutionalized, do you feel he (she) has made an adjustment which is:
______1. Good
______2. Fair
______3. Poor

(21) If and when this person is ready for discharge from the institution do you feel that he (she) would most likely be:
______1. Completely self-sufficient
______2. Partially self-sufficient
______3. Completely dependent upon others

____
Name of person completeing this form

____
Date

EXHIBIT G

Supplementary Code for Institutional Adjustment Form

Column 1

1 Male
2 Female

Column 2

x,0 Annex for Defective Delinquents
x,1 St. Cloud and YCC
x,2 Cambridge
x,3 Faribault
x,4 Owasso
x,5 Anoka
x,6 Hastings
x,7 Moose Lake
x,8 Rochester
x,9 St. Peter
y,0 Willmar
y,1 Gillette Hospital

Columns 3-4

County of settlement numbered alphabetically 01 Aitkin to 87 Yellow Medicine

Appendix B

TABLE 56

***Chi*-Square Tests for Independence of Classification of Quality of Adjustment and Categorical Characteristics of Community and Institutionalized Dischargees**

	Community (*N* = 161)		Institutionalized (*N* = 183)		Both (*N* = 409)	
Characteristic	*Chi*-Square	*df*	*Chi*-Square	*df*	*Chi*-Square	*df*
Sex	0.045	1	1.032	1	2.852	2
Home community	3.939	2	2.533	2	5.107	4
Home situations	0.479	3	3.714	3	17.599*	6
County of settlement	0.587	1	0.506	1	0.192	2
Familial deficiency	0.454	1	0.601	1	7.122	2
Physical disability	0.238	1	0.128	1	21.407*	2
Delinquent behavior	6.822*	1	1.050	1	3.284	2
Prior institutionalization	0.847	1	0.670	1	6.236	2

Note.—Asterisk (*) indicates a significant difference in percentages at a probability of .01 or less.

TABLE 57

Percentages of Community Dischargees Making Good and Poor Adjustments by Location with *Chi*-Square Values for Independence of Classifications

Characteristic	Good (*N* = 99)	Poor (*N* = 62)	Both (*N* = 161)	*Chi*-Square	*df*
	per cent	per cent	per cent		
County of residence					
Hennepin or Ramsey	40.4	41.9	41.0	0.037	1
Other	59.6	58.1	59.0		
Present whereabouts					
In county of settlement	71.7	75.8	73.3	0.326	1
In another county	28.3	24.2	26.7		

TABLE 58

***Chi*-Square Values for Independence of Classification of Community Dischargees by Quality of Total Adjustment and Specific Adjustment Components**

Item	*N*	*Chi*-Square[a]	*df*
Marital status	161	0.195	1
Economic self-sufficiency	157	7.685	3
Physical handicaps affecting employment or employability	160	2.269	2
Ability to manage funds	150	34.611*	2
Social relations	161	40.513*	1
Supervision (non-employment) quality	156	24.218*	2
Participation in social activities	157	25.598*	2
Personal hygiene	159	14.060*	1
Cooperation with welfare board	160	24.374*	2
Law violations	161	9.727*	1
Sexual adjustment	159	13.242*	1

[a] Asterisk (*) indicates a significant difference in percentages at a probability of .01 or less.

TABLE 59

***Chi*-Square Values for Independence of Classification of Institutionalized Dischargees by Quality of Total Adjustment and Specific Adjustment Components**

Item	*N*	*Chi*-Square[a]	*df*
Relations with associates	183	60.749*	1
Cooperation with staff	183	54.171*	1
Responsibility of work	183	20.787*	3
Quality of work performance	183	25.262*	2
Runaway frequency	183	7.597*	1
Interest in social activities	182	10.917*	1
Supervision required	183	39.645*	3
Sexual adjustment	182	13.704*	1
Physical condition	183	0.005	1
Mental disturbance	183	31.385*	1
Economic prognosis	183	11.300*	2

[a] Asterisk (*) indicates a significant difference in percentages at a probability of .01 or less.

TABLE 60

Variance Ratio Values for Significance of Three Discriminant Variables for Differentiating Successful and Unsuccessful Dischargees

Sample	Discriminant Variable	F[a]	n_1	n_2
1	Y_1	10.19*	3	202
2	Y_2	14.22*	3	199
Both	Y_T	23.55*	3	405

[a] Asterisk (*) indicates a significant difference between groups at a probability of .01 or less.

TABLE 61

Percentages of Correct Classifications Common to Pairs of Dichotomous Methods

Methods	Adjustment Group Successful (*N* = 226)	 Unsuccessful (*N* = 183)	 Both (*N* = 409)
	per cent	per cent	per cent
Physical disability-admittance IQ	35.0	47.0	40.3
Physical disability-admittance age	30.1	39.3	34.2
Admittance IQ-admittance age	37.2	31.7	34.7

TABLE 62

Standard Deviations of Teacher, Houseparent, and Combined Teacher-Houseparent Ratings on Adjective Checklist for 107 Dischargees

Key	Rater Teacher	 Houseparent	 Both
Key 1	5.01	4.93	9.03
Key 2	4.13	4.60	7.40
Key 3	3.11	3.48	5.59
Total key	20.15	21.11	37.58

Note.—Degrees of freedom for each standard deviation are 106.

TABLE 63

Percentages of Correct Classifications Common to Pairs of Dichotomous Methods Using Discriminant Function and Adjective Checklist Ratings

Methods	Adjustment Group Successful (*N* = 64)	 Unsuccessful (*N* = 43)	 Both (*N* = 107)
	per cent	per cent	per cent
Discriminant function-teacher rating	42.2	46.5	43.9
Discriminant function-houseparent rating	42.2	41.9	42.1
Discriminant function-combined teacher and houseparent rating	46.9	44.2	45.8
Teacher rating-houseparent rating	56.3	65.1	59.8

TABLE 64

***Chi*-Square Values for Independence of Classification by Dichotomous Methods Using the Discriminant Function and Adjective Checklist Ratings with *Phi* Coefficients Representing Interrelations**

Methods	*Chi*-Square[a]	*Phi*[b]	*df*
Discriminant function-teacher rating	0.243	.048	1
Discriminant function-houseparent rating	0.005	.007	1
Discriminant function-combined teacher and houseparent rating	0.369	.059	1
Teaching rating-houseparent rating	37.159*	.589*	1

[a,b] Asterisk (*) indicates a significant deviation from expected values under the hypothesis of independence of classifications at a probability of .01 less.

Appendix C

EXHIBIT H

Speech Information Sheet

Name______________________________ Sex M____ F____

Age (years)__________ (months)__________ Grade__________

Does he live with: Both parents_____ Mother_____ Father_____ Other_______

Number of brothers: Older______________ Younger______________

Number of sisters: Older______________ Younger______________

Is the child a twin? Yes_______ No_______ Identical? Yes_______ No_______

If he is a fraternal twin, what is the sex of the other twin? M_____ F_____

Is the other twin mentally retarded? Yes_____ No_____

Where is the other twin?______________________________

Is the child right-handed?_______ Left-handed?_______ Ambidextrous?_______

Is the child hard of hearing? Very______ Some______ Slightly______ No______

How often do you have difficulty understanding his speech?

Almost always_____ Frequently_____ Occasionally_____ Seldom_____.

Almost never_____

Does he have a peculiar voice quality? Yes_____ No_____ Describe:

Does he stutter? Yes____ No____ Does he repeat the whole word? Yes____ No____

Does he repeat the first letter? Yes_____ No_____

Does the child lisp? Yes_____ No_____ Which sounds?______________

With which vowels does the child have difficulty? ______________

Which consonants?______________________________

If the child has a speech defect, is he sensitive about it? Yes_____ No_____

Is he scolded or teased about it? Yes_____ No_____

Has he had any speech corrective work? Yes_____ No_____

How long?__________ When?__________ For what?__________

What other information can you give about his speech?

APPENDIX C

EXHIBIT I

Supplementary Biographical Data Sheet

School________________________________ Teacher______________________

Pupil's Name______________________________ Birthdate________________

What is the probable cause of the child's mental retardation?

When was the child first admitted to a special class?____________________

How long has he been in the special class?__________________________

Would the parents of the child be judged to be mentally retarded? Yes____ No____

Does the child have any brothers or sisters who would be judged to be mentally retarded? Yes_____ No_____ If yes, how many?________________

Are they in special classes? Yes___ No___ Are they in institutions? Yes___ No___

Has the child ever been in an institution? If yes, which institution was he in?_____ ______________________ When?________ For how long?________

Does the child live on a farm? Yes_____ No_____ Does he live in a town other than Duluth, Minneapolis, or St. Paul? Yes_____ No_____

What is his last available IQ score?_________ Test__________________

Date administered__________ Administered by whom?______________

Does the child have a physical defect? Yes____ No____ If yes, what?__________

Has the child been reported for delinquency? Yes____ No____ If yes, what?______ ________________________________ When?______________

Has he appeared in court for these delinquencies? Yes_____ No_____

Please give any additional information which you believe to be pertinent.

EXHIBIT J

Adjective Checklist

Pupil's name____

Directions: The following words and phrases (terms) have been used to describe the behavior of young people. Check as many of the following items as necessary to give us a description of the child's behavior. The behavior may or may not be extreme in order for you to check the item. Check those items which are more characteristic of this child than of other children of the same age with whom you work. Leave blank those which are not particularly descriptive of this subject.

_____ 1. annoying
_____ 2. anti-social
_____ 3. anxious to learn
_____ 4. anxious to please
_____ 5. attentive
_____ 6. bad influence
_____ 7. behavior problem
_____ 8. belligerent

______ 9. bossy
______10. cannot get along with others
______11. changeable
______12. cooperative
______13. courteous
______14. daring
______15. defiant
______16. destructive
______17. difficult to control
______18. disobedient
______19. distractible
______20. gets along well with others
______21. good natured
______22. hard to discipline
______23. incoherent
______24. incorrigible
______25. indifferent
______26. irresponsible
______27. likeable
______28. moody
______29. no discipline problem
______30. obedient
______31. pleasant
______32. quarrelsome
______33. quick-tempered
______34. quiet
______35. rebellious
______36. stubborn
______37. sullen
______38. temper-tantrums
______39. unable to play with others
______40. unreliable
______41. unstable
______42. untruthful
______43. well-behaved
______44. well-liked
______45. willing

EXHIBIT K

Behavior Rating Scale[a]

Pupil's name____

Directions: Fourteen areas of behavior are listed below with five descriptive categories in each area. Place a plus mark (+) before that category under each area which best describes the child's behavior. If you feel that the child varies sufficiently from day to day so that other categories within the area are also appropriate, place a check mark (√) before these additional categories.

1. Conformity to requests—general cooperativeness:
    ______1. Typically refuses, resists, and means it—cannot give cooperation voluntarily.
    ______2. Often refuses, but is open to persuasion—can be talked with.
    ______3. Frequently refuses, but only when upset, or teasing, or for some special reason.
    ______4. Rarely refuses, and only with special provocation.
    ______5. Typically complies and is spontaneously helpful.
2. Individual constructive activities:
    ______1. Even with suggestion and direction, usually "rams around," cannot carry on any constructive activity; generally destructive, although not necessarily by intention.
    ______2. With some suggestion and direction, can get a constructive activity under way, but needs almost constant adult attention to keep at it.
    ______3. Needs help at beginning, but can carry on an activity suitable for him "on his own."
    ______4. Initiates own constructive activity, seeks help when needed, but generally is constructive.

---

[a] Adapted from 1957 Behavior Ratings Basal Scale, developed by Dr. Harriet Blodgett and her staff at Sheltering Arms, research and day care center for retarded children in Minneapolis, Minnesota.

______5. Initiates own constructive activities, in variety; gets satisfaction from them; completes them without special assistance.

3. Participation with the group:

______1. "Lone wolf"; very rare participation in group; typically solitary. In group only with adult forcing for inclusion.
______2. Rare group participation, in only a few activities, and with adult steering.
______3. Selective participation in a group, depending on who else is in it.
______4. Generally is a part of whatever group activity is going on; prefers group activities.
______5. Typically a group is around him; shows high degree of participation and organization; a "leader."

4. Interaction with individuals:

______1. Typically alone; very rare interaction with an individual on own initiative; may be with another child at other's initiative.
______2. Interacts with adults more than with children; dependent rather than social.
______3. Frequent interaction with individuals; may not be successful, but many contacts.
______4. Very frequent interaction with individuals; longer duration than No. 3, without special supervision.
______5. Very successful with individual contacts; initiates and sustains them.

5. Interest and progress in learning:

______1. Shows regressive behavior; or seems to resist learning.
______2. Rather a "dead level" on progress in learning; shows little forward motion.
______3. Shows interest in learning in some areas; not consistently, and may be short-lived; progress variable.
______4. Consistently can be aroused to interest; makes moderate progress and shows moderate effort in most areas.
______5. Consistently eager to learn; asks useful questions; seems motivated; voluntary effort quite consistently.

6. Independence and self-help:

______1. Dependent, won't try to do things for self. Expects and demands things done for him.
______2. Generally dependent in "practice" but willing to try; will do some things for self with direction and encouragement and help.
______3. Takes moderate self-responsibility to extent of ability, does not need constant attention; verbal help may be increasingly substituted for physical help.
______4. Takes major responsibility for self most of the time; occasional encouragement or praise helpful.
______5. Likes to do things for himself; takes pride in independence; shows good judgment and tolerates help when really needed.

7. Persistence with tasks:

______1. Highly distractible; "flits"; minimal interest in making any effort.
______2. Easily distracted, but can show some persistence with an occasional favorite activity.
______3. Fairly persistent with something he likes or wants to do; gives up easily with tasks lacking special interest.
______4. Consistently persistent with most activities; can return to task when distracted momentarily; gives up only when really stymied.

______5. Determined to finish whatever he's working on; won't give up; not readily distracted. Lots of task orientation.

8. Constructive conversation and communication:

______1. Can or does talk very little; communication efforts minimal, either by gesture or word.

______2. Tries to communicate; speech often nonsensical or elliptical, or difficult to comprehend what child is trying to convey.

______3. Regardless of speech skill, expresses self and communicates; may be random or meaningless.

______4. Regardless of speech skill, conveys meanings reasonably well; generally sensible.

______5. Good verbal expression skills; uses language meaningfully to communicate with others. "Talks sense."

9. Excessive conversation:

______1. Incessant talking—not conversational; attention-getting, controlling, repetitious, or as dependency; or disconnected content.

______2. Rambling and random chatter, but sometimes has a point, and child beginning to show some control.

______3. Generally not constant chatter, but purpose often unclear.

______4. Conversation is two-way most of the time, but less mature than No. 5.

______5. Conversation is two-way, communicative, reasonable, purposive.

10. Stability of activity level—degree of freedom from hyperactivity:

______1. Typically restless and overactive; behavior random, unpredictable, impulsive, nonsocially aware.

______2. Frequently hyperactive, impulsive, and random, but can control to some extent with adult help.

______3. Generally not hyperactive "on his own," but overresponds to group stimulation and needs adult help to settle down.

______4. Occasional bursts of hyperactivity, but increasing degree of self-control.

______5. May be active and enthusiastic when appropriate, but rarely hyperactive; activity generally controlled by child, shows purpose and organization.

11. Absence of anti-social behavior and fighting:

______1. Randomly and constantly aggressive toward any person or thing; unselective, really hurts, doesn't care.

______2. Typically aggressive and anti-social, but with some selectivity as to object; comes under adult control with difficulty when angry.

______3. Frequently aggressive and anti-social, but with some provocation; comes under adult control easily.

______4. Rarely aggressive or anti-social; seems not to get involved in fights often; takes quite a lot before retaliating.

______5. Relationships with others, both children and adults, are harmonious; child seems aware of others' feelings and does not fight without real cause.

12. Absence of irritability:

______1. Hyperirritable; over-reacts to any stimulus, including teasing, without ability to interpret situations.

______2. Very easily irritated; over-reacts to most stimuli, but irritations do not "pile up" uncontrollably if adult is near to help stabilize.

______3. Easily irritated by teasing or other stimulation; cries easily, but generally quick recovery. Child trying to control.

______4. Generally can be counted on to react good-humoredly; usually in a good mood, but may have outbursts with provocation.

______5. Unusually easy-going and even in disposition; successful at give and take with other children.

13. Ability to tolerate frustration:
    ______1. Will not try anything he might fail—avoids frustration by limiting activities, cannot tolerate being frustrated.
    ______2. Very easily frustrated, upset, "stormy," with minimal cause.
    ______3. Gets frustrated often but "snaps back" quickly with encouragement or help.
    ______4. Shows frustration only with observable, realistic causes; tries to control.
    ______5. Very rarely shows frustration; overcomes difficulties; makes patient effort.
14. Apparent health:
    ______1. Shows observable and objective symptoms of not feeling good (runny nose, cough, etc.).
    ______2. Seems vaguely tired, listless, non-participating, but no objective observable symptoms.
    ______3. Shows average energy, looks okay, seems in average health.
    ______4. Energetic, positive response; seems in good health.
    ______5. Bubbling with pep, vitality, enthusiasm.

Appendix D

TABLE 65

Distribution of 1956-57 Special Class Enrollment by Birth Year of Students and Level and Location of Class

Birth Year and Class Level	City				
	Minneapolis	St. Paul	Duluth	Other Cities	All Cities
1942					
Elementary	11	33	6	18	68
Junior-senior high school	119	52	37	37	245
Both	130	85	43	55	313
1943					
Elementary	24	51	18	57	150
Junior-senior high school	114	29	24	38	205
Both	138	80	42	95	355
1944					
Elementary	86	70	45	60	261
Junior-senior high school	28	13	0	27	68
Both	114	83	45	87	329
1945					
Elementary	105	72	28	88	293
Junior-senior high school	1	1	1	9	12
Both	106	73	29	97	305
1946					
Elementary	90	68	21	100	279
Junior-senior high school	0	0	0	16	16
Both	90	68	21	116	295
All years					
Elementary	316	294	118	323	1,051
Junior-senior high school	262	95	62	127	546
Both	578	389	180	450	1,597

Note.—Restricted to birth years 1942 through 1946, inclusive, and excluding two classes at the Michael Dowling School for crippled children in Minneapolis.

TABLE 66

Distribution of 207 Retardates in 15 Special Classes in 1956-57 by Birth Year of Students and Level and Location of Class

Birth Year and Class Level	City				
	Minneapolis	St. Paul	Duluth	Other Cities	All Cities
1942					
Elementary	2	6	2	3	13
Junior-senior high school	6	9	7	6	28
Both	8	15	9	9	41
1943					
Elementary	6	11	2	5	24
Junior-senior high school	23	4	5	8	40
Both	29	15	7	13	64
1944					
Elementary	12	8	4	7	31
Junior-senior high school	7	2	0	3	12
Both	19	10	4	10	43
1945					
Elementary	12	6	7	7	32
Junior-senior high school	0	0	1	1	2
Both	12	6	8	8	34
1946					
Elementary	8	0	2	10	20
Junior-senior high school	0	0	0	5	5
Both	8	0	2	15	25
All years					
Elementary	40	31	17	32	120
Junior-senior high school	36	15	13	23	87
Both	76	46	30	55	207

Note.—These pupils were not all enrolled in 1957-58. They represented expectations of numbers to be tested in the fall of 1957.

TABLE 67

Distribution of Day Class and Institutionalized Boys and Girls by Number of Siblings in Family

	Day Class		Institutionalized	
Number of Siblings	Boys (N = 105)	Girls (N = 68)	Boys (N = 102)	Girls (N = 50)
13	—	—	1	—
12	—	—	2	—
11	—	1	—	—
10	1	1	1	1
9	4	2	—	2
8	1	3	—	—
7	5	4	4	3
6	5	4	8	4
5	9	2	10	6
4	18	5	13	8
3	16	16	15	12
2	24	9	18	9
1	13	13	10	3
0	6	6	5	1
No information	3	2	5	1
Totals	105	68	102	50

TABLE 68

Distribution of Day Class and Institutionalized Boys and Girls by Selected Items from Speech Information Sheet

	Day Class		Institutionalized	
Item and Category	Boys ($N = 105$)	Girls ($N = 68$)	Boys ($N = 102$)	Girls ($N = 56$)
Subject is a twin				
Yes	2	2	9	3
No	89	52	85	51
No information	14	14	8	2
Subject uses right or left hand				
Right	81	55	87	44
Left	15	8	13	12
Ambidextrous	1	—	—	—
No information	8	5	2	—
Subject is hard of hearing				
Yes	11	6	4	2
No	75	46	94	53
No information	19	16	4	1
Difficulty in understanding subject's speech				
Almost always, frequently, occasionally, or seldom	24	8	31	15
Almost never	58	45	55	33
No information	23	15	16	8
Subject has a peculiar voice quality				
Yes	17	10	15	9
No	63	40	79	42
No information	25	18	8	5
Subject stutters				
Yes	11	6	21	5
No	75	49	77	22
No information	19	13	4	3
Subject lisps				
Yes	4	6	8	4
No	69	41	82	46
No information	32	21	12	6

TABLE 69

Distribution of Day Class and Institutionalized Boys and Girls by Selected Items from Supplementary Biographical Data Sheet

Item and Category	Day Class Boys ($N = 105$)	Day Class Girls ($N = 68$)	Institutionalized Boys ($N = 102$)	Institutionalized Girls ($N = 56$)
Subject's parents judged mentally retarded				
Yes	9	8	32	25
No	42	19	65	29
No information	54	41	5	2
Subject's sibs judged mentally retarded				
Yes	23	21	37	24
No	53	27	58	25
No information	29	20	7	7
Subject has physical defect				
Yes	20	15	28	14
No	70	43	73	40
No information	15	10	1	2
Location of subject's home				
City	66	56	34	18
Town	23	11	46	24
Farm	13	1	18	11
No information	3	—	4	3
Subject has been reported delinquent				
Yes	10	3	17	3
No	75	56	85	50
No information	20	9	—	3

TABLE 70

Standard Deviations of WISC Verbal, Performance, and Full-Scale IQs by Sex and Location of Subjects

		Measure			
Group	*N*	Verbal	Performance	Full-Scale	V-P Difference
Day class					
Boys	105	9.38	15.27	11.58	13.24
Girls	68	10.15	15.61	12.19	13.38
Institutionalized					
Boys	102	8.38	14.77	10.79	13.23
Girls	56	7.61	14.07	10.53	11.17
Boys total	207	8.97	15.03	11.20	13.24
Girls total	124	9.10	14.94	11.47	12.43
Day class total	173	9.87	15.40	11.82	13.28
Institutionalized total	158	8.24	14.54	10.70	12.58
Grand total	331	9.02	15.00	11.30	12.94

Note.—Degrees of freedom associated with each standard deviation are *N*-2 for day class and institutionalized subgroups, *N*-10 for total sex and location groups, and *N*-20 = 311 for the grand total of subjects.

TABLE 71

Standard Deviations of WISC Verbal Scale Scores by Sex and Location of Subjects

		Measure					
Group	*N*	I	C	A	S	V	DS
Day class							
Boys	105	1.67	2.07	1.63	2.30	1.80	2.65
Girls	68	1.58	2.29	1.93	2.43	2.19	2.71
Institutionalized							
Boys	102	1.98	1.88	1.64	2.03	1.76	2.10
Girls	56	1.35	2.25	1.44	1.83	1.77	2.48
Boys total	207	1.81	2.02	1.75	2.28	1.84	2.52
Girls total	124	1.48	2.27	1.74	2.22	2.01	2.60
Day class total	173	1.62	2.16	1.94	2.47	2.01	2.68
Institutionalized total	158	1.78	2.07	1.57	2.00	1.79	2.40
Grand total	331	1.70	2.12	1.77	2.28	1.90	2.55

Note.—Verbal measures are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Degrees of freedom associated with each standard deviation are *N*-2 for day class and institutionalized subgroups, *N*-10 for total sex and location groups, and *N*-20 = 311 for the grand total of subjects.

TABLE 72

Standard Deviations of WISC Performance Scale Scores by Sex and Location of Subjects

		Measure					
Group	*N*	PC	PA	BD	OA	Cd	M
Day class							
Boys	105	2.95	2.90	3.07	3.05	2.47	3.02
Girls	68	2.91	3.03	2.97	3.41	3.00	3.01
Institutionalized							
Boys	102	2.61	2.71	3.02	3.50	2.44	2.89
Girls	56	2.17	2.61	2.22	3.37	2.87	2.75
Boys total	207	2.79	2.81	3.04	3.28	2.48	2.95
Girls total	124	2.61	2.85	2.98	3.39	2.91	2.89
Day class total	173	2.94	2.95	3.03	3.20	2.73	3.01
Institutionalized total	158	2.47	2.68	2.77	3.45	2.52	2.84
Grand total	331	2.72	2.92	2.91	3.32	2.63	2.93

Note.—Performance measures are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each standard deviation are *N*-5 for day class and institutionalized subgroups, *N*-10 for total sex and location groups, and *N*-20 = 311 for the grand total of subjects.

TABLE 73

Intercorrelations of Scale Scores on 12 WISC Subtests for 105 Day Class Boys

Measure	Measure										
	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.423*	.404*	.328*	.520*	.279*	.154	.290*	.197	.197	.342*	.123
C		.240*	.259*	.313*	.224	.270*	.320*	.282*	.283*	.298*	.163
A			.328*	.235	.414*	.148	.348*	.307*	.191	.420*	.332*
S				.490*	.306*	.232	.437*	.420*	.347*	.197	.107
V					.263*	.074	.430*	.112	.290*	.243	.023
DS						.175	.394*	.297*	.269*	.352*	.157
PC							.405*	.524*	.602*	.325*	.372*
PA								.570*	.610*	.422*	.390*
BD									.584*	.490*	.449*
OA										.308*	.361*
Cd											.345*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-9 = 96. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .05 or less.

TABLE 74

Intercorrelations of Scale Scores on 12 WISC Subtests for 68 Day Class Girls

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.432*	.360*	.356*	.513*	.379*	.222	.220	.100	.129	.145	−.007
C		.344*	.435*	.373*	.185	.368*	.492*	.202	.205	.413*	.333*
A			.532*	.376*	.507*	.223	.443*	.245	.250	.322*	.336*
S				.501*	.461*	.356*	.482*	.353*	.216	.222	.251
V					.363*	.274	.345*	.283	.281	.315	.257
DS						.164	.365*	.194	.253	.147	.278
PC							.491*	.456*	.476*	.380*	.401*
PA								.427*	.498*	.410*	.523*
BD									.480*	.185	.375*
OA										.347*	.469*
Cd											.531*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-6 = 62. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 75

Intercorrelations of Scale Scores on 12 WISC Subtests for 102 Institutionalized Boys

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.506*	.616*	.462*	.581*	.311*	.303*	.427*	.237	.174	.409*	.119
C		.347*	.367*	.466*	.088	.161	.338*	.127	.148	.381*	.218
A			.508*	.380*	.397*	.410*	.507*	.486*	.327*	.488*	.332*
S				.412*	.233	.128	.375*	.171	.168	.254	.044
V					.141	.036	.341*	.103	.067	.311*	.068
DS						.280*	.297*	.200	.151	.120	.100
PC							.497*	.549*	.457*	.396*	.331*
PA								.375*	.334*	.479*	.376*
BD									.676*	.391*	.492*
OA										.473*	.461*
Cd											.380*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-6 = 96. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 70

Intercorrelations of Scale Scores on 12 WISC Subtests for 60 Institutionalized Girls

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.427*	.548*	.279	.283	.311	.316	.520*	.363*	.247	.480*	.202
C		.370*	.424*	.612*	.134	.377*	.457*	.394*	.285	.353	.204
A			.155	.137	.387*	.394*	.458*	.410*	.347	.371*	.200
S				.431*	.040	.287	.188	.102	−.051	.144	.048
V					−.005	.479*	.377*	.201	.273	.072	.305
DS						.280	.250	.208	.355*	.461*	.222
PC							.582*	.575*	.432*	.404*	.477*
PA								.510*	.540*	.536*	.425*
BD									.606*	.276	.650*
OA										.338*	.506*
Cd											.392*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-2 = 58. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 77

Intercorrelations of Scale Scores on 12 WISC Subtests for 207 Day Class and Institutionalized Boys

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.464*	.502*	.487*	.549*	.291*	.227*	.327*	.217*	.184*	.278*	.139
C		.343*	.361*	.491*	.163	.231*	.329*	.196*	.212*	.321*	.192*
A			.409*	.264*	.407*	.259*	.417*	.386*	.254*	.442*	.331*
S				.450*	.306*	.188*	.410*	.310*	.258*	.321*	.079
V					.225*	.057	.362*	.161	.181	.273*	.044
DS						.221*	.356*	.352*	.309*	.341*	.140
PC							.448*	.525*	.328*	.257*	.391*
PA								.478*	.467*	.442*	.261*
BD									.578*	.442*	.471*
OA										.421*	.411*
Cd											.382*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-11 = 196. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .05 or less.

TABLE 78

Intercorrelations of Scale Scores on 12 WISC Subtests for 116 Day Class and Institutionalized Girls

	Measure										
Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.420*	*.443*	.353*	.432*	.352*	.254*	.335*	.191	.178	.277*	.180
C		.351*	.426*	.396*	.152	.381*	.477*	.368*	.240*	.389*	.312*
A			.410*	.397*	.364*	.370*	.447*	.368*	.388*	.405*	.323*
S				.326*	.305*	.381*	.379*	.301*	.112	.194	.170
V					.225	.341*	.398*	.293*	.271*	.237	.373*
DS						.204	.326*	.230	.313*	.398*	.338*
PC							.314*	.461*	.435*	.386*	.436*
PA								.454*	.310*	.457*	.465*
BD									.351*	.216	.473*
OA										.351*	.344*
Cd											.485*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-3 = 113. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 70

Intercorrelations of Scale Scores on 12 WISC Subtests for 170 Day Class Subjects

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.425*	.398*	.476*	.513*	.314*	.170	.321*	.182	.160	.238*	.075
C		.342*	.385*	.540*	.200	.318*	.362*	.302*	.241*	.344*	.339*
A			.413*	.294*	.406*	.177	.390*	.382*	.319*	.374*	.334*
S				.554*	.298*	.294*	.400*	.365*	.280*	.308*	.182
V					.383*	.157	.336*	.241*	.270*	.377*	.131
DS						.171	.362*	.307*	.276*	.300*	.315*
PC							.432*	.406*	.342*	.340*	.392*
PA								.514*	.399*	.415*	.440*
BD									.494*	.332*	.401*
OA										.190*	.409*
Cd											.454*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-2 = 168. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .05 or less.

TABLE 20

Intercorrelations of Scale Scores on 12 WISC Subtests for 150 Institutionalized Subjects

Measure	C	A	S	V	DS	PC	PA	BD	OA	Cd	M
I	.475*	.367*	.411*	.464*	.300*	.305*	.447*	.304*	.155	.404*	.155
C		.352*	.390*	.326*	.106	.230*	.360*	.206	.149	.276*	.261*
A			.306*	.362*	.451*	.408*	.401*	.473*	.302*	.311*	.320*
S				.416*	.167	.175	.313*	.175	.067	.318*	.045
V					.080	.170	.302*	.156	.136	.304*	.147
DS						.274*	.344*	.320*	.321*	.347*	.143
PC							.313*	.354*	.443*	.368*	.370*
PA								.416*	.414*	.402*	.342*
BD									.490*	.361*	.334*
OA										.451*	.302*
Cd											.370*

Note.—Verbal subtests are: I, Information; C, Comprehension; A, Arithmetic; S, Similarities; V, Vocabulary; and DS, Digit Span. Performance subtests are: PC, Picture Completion; PA, Picture Arrangement; BD, Block Design; OA, Object Assembly; Cd, Coding; and M, Mazes. Degrees of freedom associated with each coefficient are N-2 = 148. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 81

Standard Deviations of Behavior Rating Scale and Adjective Checklist Scores by Sex and Location of Subjects

Group	N	Behavior Rating Scale	Key 1	Key 2	Key 3	Total
		Measures				
			Adjective Checklist			
Day class						
Boys	105	10.63	4.58	2.01	1.51	17.78
Girls	68	9.15	3.22	1.80	1.59	16.34
Institutionalized						
Boys	102	10.47	5.18	2.08	3.11	20.70
Girls	56	10.41	4.41	1.56	3.31	18.08
Boys total	207	10.55	4.93	2.04	2.98	18.24
Girls total	124	9.75	4.07	1.61	3.30	17.37
Day class total	173	10.08	4.06	1.47	3.61	17.06
Institutionalized total	158	10.45	4.80	1.61	3.08	18.23
Grand total	331	10.30	4.86	1.56	3.75	18.58

Note.—Degrees of freedom associated with each standard deviation are *N*-5 for day class and institutionalized subgroups, *N*-10 for total sex and location groups, and *N*-20 = 311 for the grand total of subjects. Total Adjective Checklist scores were computed by the formula 50 + 3 (Key 1)-(Key 2)-(Key 3).

TABLE 82

Standard Deviations of Stanford Achievement Subtest Scores by Sex and Location of Subjects

Group	N	PM	WM	S	AR	AC
		Measures				
Day class						
Boys	105	11.80	9.42	7.84	4.99	11.37
Girls	68	12.28	9.43	7.25	4.63	9.30
Institutionalized						
Boys	102	12.90	10.10	8.81	5.20	12.93
Girls	56	11.01	8.98	8.58	4.63	13.13
Boys total	207	12.40	9.78	8.33	5.09	12.18
Girls total	124	12.11	9.10	7.80	4.63	11.23
Day class total	173	11.98	9.41	7.62	4.88	10.65
Institutionalized total	158	12.63	9.89	8.72	5.01	13.00
Grand total	331	12.29	9.55	8.18	4.93	11.83

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each standard deviation are *N*-5 for day class and institutionalized subgroups, *N*-10 for total sex and location groups, and *N*-20 = 311 for the grand total of subjects.

TABLE 63

Summary of Grade Score Norms on Stanford Achievement Subtests

Raw Score	Measure PM	WM	S	AR	AC
60	3.8	4.8	—	—	3.4
55	3.4	4.1	—	—	3.3
50	3.3	3.8	4.7	—	2.9
45	3.0	3.3	3.8	—	2.8
35	2.7	3.0	3.3	4.0	2.6
25	2.5	2.8	3.0	3.0	2.4
20	2.4	2.5	2.7	2.8	2.3
15	2.3	2.3	2.4	2.7	2.1
10	2.0	2.1	2.2	2.2	1.9
0	1.0	1.0	1.0	1.0	1.0
Number of items	60	55	50	35	60

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation.

TABLE 64

Intercorrelations of Stanford Achievement Subtest Scores for 100 Day Class Boys

Measure	Measure WM	S	AR	AC
PM	.810	.707	.673	.612
WM		.620	.615	.593
S			.680	.564
AR				.610

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-2 = 98. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 65

Intercorrelations of Stanford Achievement Subtest Scores for 64 Day Class Girls

Measure	Measure WM	S	AR	AC
PM	.850	.730	.807	.720
WM		.840	.725	.701
S			.604	.634
AR				.820

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-2 = 62. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 66

Intercorrelations of Stanford Achievement Subtest Scores for 102 Institutionalized Boys

Measure	Measure WM	S	AR	AC
PM	.812	.866	.780	.710
WM		.820	.781	.677
S			.820	.710
AR				.870

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-4 = 98. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 67

Intercorrelations of Stanford Achievement Subtest Scores for 59 Institutionalized Girls

Measure	Measure WM	S	AR	AC
PM	.890	.820	.713	.657
WM		.780	.771	.620
S			.737	.728
AR				.802

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-4 = 55. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 68

Intercorrelations of Stanford Achievement Subtest Scores for 207 Day Class and Institutionalized Boys

Measure	Measure WM	S	AR	AC
PM	.814	.818	.735	.676
WM		.820	.680	.623
S			.721	.647
AR				.843

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-11 = 196. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 89

Intercorrelations of Stanford Achievement Subtest Scores for 124 Day Class and Institutionalized Girls

	Measure			
Measure	WM	S	AR	AC
PM	.877	.787	.702	.663
WM		.811	.744	.664
S			.687	.662
AR				.800

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-11 = 113. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 90

Intercorrelations of Stanford Achievement Subtest Scores for 173 Day Class Subjects

	Measure			
Measure	WM	S	AR	AC
PM	.805	.774	.724	.652
WM		.827	.640	.630
S			.651	.566
AR				.820

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-11 = 162. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 91

Intercorrelations of Stanford Achievement Subtest Scores for 158 Institutionalized Subjects

	Measure			
Measure	WM	S	AR	AC
PM	.806	.828	.700	.705
WM		.820	.784	.663
S			.700	.716
AR				.847

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-11 = 147. All coefficients are significantly different from zero at a probability of .01 or less.

TABLE 98

Percentages by Sex of Institutionalized Subjects Rated Favorably on Each Behavior Rating Scale Item with *Chi-Square* Values for Independence of Classifications

Item No.	Sex Boys (*N* = 102)	 Girls (*N* = 56)	 Total (*N* = 158)	*Chi-Square*[a]	Probability
	per cent	per cent	per cent		
1	82.4	87.5	84.2	.710	$.30<p<.50$
2	50.0	35.7	44.9	2.9063	$.05<p<.10$
3	53.9	67.9	58.9	2.8500	$.05<p<.10$
4	48.0	57.1	51.3	1.1100	$.20<p<.30$
5	59.8	66.1	62.0	.3000	$.50<p<.70$
6	47.1	50.0	48.1	.1125	$.70<p<.80$
7	54.9	50.0	53.2	.3450	$.50<p<.70$
8	80.4	76.8	79.1	.2844	$.50<p<.70$
9	79.4	76.8	78.5	.0110	$.90<p<.95$
10	76.5	80.4	77.8	.3110	$.50<p<.70$
11	79.4	85.7	81.6	.6756	$.30<p<.50$
12	86.3	89.3	87.3	.2500	$.50<p<.70$
13	77.5	82.1	79.1	.4012	$.30<p<.50$
14	33.3	19.6	28.5	3.3320	$.05<p<.10$

Note.—Categories 4 and 5 on each item indicate desirable behavior.

[a] Degrees of freedom equal one.

TABLE 99

Percentages by Special Class Availability of Institutionalized Subjects Rated Favorably on Each Behavior Rating Scale Item with *Chi-Square* Values for Independence of Classifications

Item No.	Special Class Available? Yes (*N* = 71)	 No (*N* = 87)	 Total (*N* = 158)	*Chi-Square*[a]	Probability
	per cent	per cent	per cent		
1	77.5	89.7	84.2	4.3012	$.02<p<.05$
2	40.8	48.3	44.9	.672	$.30<p<.50$
3	56.3	60.9	58.9	.339	$.50<p<.70$
4	49.3	52.9	51.3	.200	$.50<p<.70$
5	53.5	69.0	62.0	3.9150	$.02<p<.05$
6	42.3	52.9	48.1	1.7000	$.10<p<.20$
7	45.1	59.8	53.2	3.3962	$.05<p<.10$
8	78.9	79.3	79.1	.004	$.90<p<.95$
9	70.4	85.1	78.5	4.9516	$.02<p<.05$
10	70.4	83.9	77.8	4.123	$.02<p<.05$
11	74.6	87.4	81.6	4.213	$.02<p<.05$
12	81.7	92.0	87.3	3.725	$.05<p<.10$
13	70.4	86.2	79.1	5.805	$.01<p<.02$
14	28.2	28.7	28.5	.187	$.50<p<.70$

Note.—Categories 4 and 5 on each item indicate desirable behavior.

[a] Degrees of freedom equal one.

TABLE 94

Percentages by Sex of Institutionalized Subjects for Whom Each Adjective Checklist Item Was Marked with *Chi-Square* Values for Independence of Classifications

		Sex				
Item No.	Key No.	Boys ($N = 102$)	Girls ($N = 56$)	Total ($N = 158$)	*Chi-Square**	Probability
		per cent	per cent	per cent		
1	3	27.5	8.9	20.9	7.506	$p<.01$
2	2	14.7	10.7	13.3	.500	$.30<p<.50$
3	1	64.7	67.9	65.8	.160	$.50<p<.70$
4	1	62.7	78.6	68.4	4.186	$.02<p<.05$
5	1	49.0	58.9	52.5	1.434	$.20<p<.30$
6	2	6.9	—	4.4	—	—
7	3	17.6	7.1	13.9	3.328	$.05<p<.10$
8	2	7.8	—	5.1	—	—
9	3	6.9	10.7	8.2	.710	$.30<p<.50$
10	3	12.7	7.1	10.8	1.182	$.20<p<.30$
11	3	13.7	16.1	14.6	.160	$.50<p<.70$
12	1	60.8	76.8	66.5	4.132	$.02<p<.05$
13	1	59.8	76.8	65.8	4.634	$.02<p<.05$
14	3	7.8	—	5.1	—	—
15	2	10.8	7.1	9.5	.558	$.30<p<.50$
16	2	6.9	—	4.4	—	—
17	2	13.7	5.4	10.8	2.637	$.10<p<.20$
18	2	10.8	1.8	7.6	4.171	$.02<p<.05$
19	3	12.7	16.1	13.9	.334	$.50<p<.70$
20	1	50.0	57.1	52.5	.740	$.30<p<.50$
21	1	69.6	80.4	73.4	2.140	$.10<p<.20$
22	2	12.7	3.6	9.5	3.541	$.05<p<.10$
23	3	2.9	—	1.9	—	—
24	2	2.9	—	1.9	—	—
25	3	15.7	12.5	14.6	.295	$.50<p<.70$
26	3	19.6	7.1	15.2	4.380	$.02<p<.05$
27	1	71.6	71.4	71.5	—	—
28	3	7.8	8.9	8.2	.056	$.80<p<.90$
29	1	64.7	82.1	70.9	5.320	$.02<p<.05$
30	1	65.7	73.2	68.4	.947	$.30<p<.50$
31	1	67.6	75.0	70.3	.935	$.30<p<.50$
32	2	7.8	5.4	7.0	.345	$.50<p<.70$
33	3	14.7	5.4	11.4	3.130	$.05<p<.10$
34	1	60.8	66.1	62.7	.432	$.50<p<.70$
35	2	12.7	3.6	9.5	3.541	$.05<p<.10$
36	2	13.7	7.1	11.4	1.552	$.20<p<.30$
37	2	5.9	5.4	5.7	—	—
38	2	2.9	—	1.9	—	—
39	3	12.7	5.4	10.1	2.168	$.10<p<.20$
40	3	23.5	12.5	19.6	2.780	$.05<p<.10$
41	3	17.6	12.5	15.8	.710	$.30<p<.50$
42	2	3.9	—	2.5	—	—
43	1	66.7	76.8	70.3	1.771	$.10<p<.20$
44	1	58.8	64.3	60.8	.452	$.50<p<.70$
45	1	71.6	83.9	75.9	3.023	$.05<p<.10$

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* Degrees of freedom equal one.

TABLE 95

Percentages by Special Class Availability of Institutionalized Subjects for Whom Each Adjective Checklist Item Was Marked with *Chi*-Square Values for Independence of Classifications

		Special Class Available?				
Item No.	Key No.	Yes ($N=71$)	No ($N=87$)	Total ($N=158$)	*Chi*-Square[a]	Probability
		per cent	per cent	per cent		
1	3	28.2	14.9	20.9	4.139	$.02<p<.05$
2	2	18.3	9.2	13.3	2.818	$.05<p<.10$
3	1	62.0	69.0	65.8	.850	$.30<p<.50$
4	1	57.7	77.0	68.4	6.708	$p<.01$
5	1	52.1	52.9	52.5	.009	$.90<p<.95$
6	2	4.2	4.6	4.4	—	—
7	3	18.3	10.3	13.9	2.069	$.10<p<.20$
8	2	8.5	2.3	5.1	—	—
9	3	11.3	5.7	8.2	1.578	$.20<p<.30$
10	3	14.1	8.0	10.8	1.485	$.20<p<.30$
11	3	19.7	10.3	14.6	2.762	$.05<p<.10$
12	1	57.7	73.6	66.5	4.387	$.02<p<.05$
13	1	59.2	71.3	65.8	2.548	$.10<p<.20$
14	3	7.0	3.4	5.1	—	—
15	2	16.9	3.4	9.5	8.235	$p<.01$
16	2	7.0	2.3	4.4	—	—
17	2	15.5	6.9	10.8	3.009	$.05<p<.10$
18	2	11.3	4.6	7.6	2.478	$.10<p<.20$
19	3	19.7	9.2	13.9	3.612	$.05<p<.10$
20	1	50.7	54.[illegible]	52.5	.173	$.50<p<.70$
21	1	69.0	77.0	73.4	1.281	$.20<p<.30$
22	2	12.7	6.9	9.5	1.520	$.20<p<.30$
23	3	1.4	2.3	1.9	—	—
24	2	1.4	2.3	1.9	—	—
25	3	15.5	13.8	14.6	.091	$.70<p<.80$
26	3	18.3	12.6	15.2	.974	$.30<p<.50$
27	1	64.8	77.0	71.5	2.867	$.05<p<.10$
28	3	11.3	5.7	8.2	1.578	$.20<p<.30$
29	1	63.4	77.0	70.9	3.520	$.05<p<.10$
30	1	64.8	71.3	68.4	.758	$.30<p<.50$
31	1	66.2	73.6	70.3	1.015	$.30<p<.50$
32	2	9.9	4.6	7.0	1.671	$.10<p<.20$
33	3	18.3	5.7	11.4	6.112	$.01<p<.02$
34	1	54.9	69.0	62.7	3.292	$.05<p<.10$
35	2	12.7	6.9	9.5	1.520	$.20<p<.30$
36	2	12.7	10.3	11.4	.210	$.50<p<.70$
37	2	8.5	3.4	5.7	—	—
38	2	1.4	2.3	1.9	—	—
39	3	15.5	5.7	10.1	4.080	$.02<p<.05$
40	3	22.5	17.2	19.6	.695	$.30<p<.50$
41	3	21.1	11.5	15.8	2.723	$.05<p<.10$
42	2	2.8	2.3	2.5	—	—
43	1	62.0	77.0	70.3	4.231	$.02<p<.05$
44	1	53.5	66.7	60.8	2.833	$.05<p<.10$
45	1	69.0	81.6	75.9	3.395	$.05<p<.10$

[a] Degrees of freedom equal one.

TABLE 96

Standard Deviations of WISC Full-Scale IQs, Behavior Rating Scale Scores, and Total Adjective Checklist Scores by Sex and Location of Retest Subjects

Group	N	Measure: WISC	Behavior Rating Scale	Adjective Checklist
Day class				
Boys	67	11.90	9.94	16.83
Girls	41	10.29	8.85	17.40
Institutionalized				
Boys	42	12.41	10.66	20.54
Girls	27	9.20	12.41	18.82
Boys total	109	12.09	10.22	18.33
Girls total	68	9.88	10.37	17.96
Day class total	108	11.32	9.55	17.04
Institutionalized total	69	11.29	11.36	19.90
Grand total	177	11.31	10.28	18.19

Note.—Degrees of freedom associated with each standard deviation are *N*-3 for day class and institutionalized subgroups, *N*-6 for total sex and location groups, and *N*-12 = 165 for the grand total of subjects.

TABLE 97

Standard Deviations of Initial Stanford Achievement Subtest Scores by Sex and Location of Retest Subjects

Group	N	Measure: PM	WM	S	AR	AC
Day class						
Boys	67	11.50	9.54	8.07	4.89	11.43
Girls	41	10.64	8.09	6.99	4.08	7.89
Institutionalized						
Boys	42	12.30	9.44	8.76	5.57	12.67
Girls	27	12.16	9.02	8.19	4.36	12.17
Boys total	109	11.81	9.50	8.34	5.16	11.91
Girls total	68	11.25	8.46	7.48	4.19	9.77
Day class total	108	11.18	9.03	7.68	4.61	10.25
Institutionalized total	69	12.24	9.28	8.55	5.15	12.48
Grand total	177	11.60	9.12	8.02	4.82	11.16

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each standard deviation are *N*-3 for day class and institutionalized subgroups, *N*-6 for total sex and location groups, and *N*-12 = 165 for the grand total of subjects.

TABLE 98

Standard Deviations of Final Stanford Achievement Subtest Scores by Sex and Location of Retest Subjects

Group	*N*	Measure				
		PM	WM	S	AR	AC
Day class						
Boys	67	11.59	8.79	7.86	4.99	10.82
Girls	41	11.26	7.47	6.39	4.00	9.30
Institutionalized						
Boys	42	13.00	9.46	9.06	[illegible]	12.38
Girls	67	12.43	8.53	8.41	5.16	12.87
Boys total	109	12.14	9.05	8.34	5.15	11.44
Girls total	68	11.73	7.90	7.24	4.49	10.32
Day class total	108	11.47	8.32	7.35	4.65	10.28
Institutionalized total	69	12.79	9.12	8.82	5.31	12.56
Grand total	177	11.99	8.63	7.94	4.91	11.21

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each standard deviation are *N*-3 for day class and institutionalized subgroups, *N*-6 for total sex and location groups, and *N*-12 = 165 for the grand total of subjects.

TABLE 99

Standard Deviations of Stanford Achievement Subtest Gain Scores by Sex and Location of Retest Subjects

Group	*N*	Measure				
		PM	WM	S	AR	AC
Day class						
Boys	67	6.93	5.55	4.23	3.79	6.11
Girls	41	7.54	4.71	3.64	2.48	6.02
Institutionalized						
Boys	42	6.70	5.12	3.00	3.33	6.94
Girls	27	4.26	3.95	3.67	2.42	7.34
Boys total	109	6.84	5.39	3.82	3.62	6.43
Girls total	68	6.47	4.43	3.65	2.46	6.56
Day class total	108	7.16	5.25	4.02	3.36	6.08
Institutionalized total	69	5.89	4.71	3.27	3.02	7.09
Grand total	177	6.70	5.05	3.76	3.23	6.48

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each standard deviation are *N*-3 for day class and institutionalized subgroups, *N*-6 for total sex and location groups, and *N*-12 = 165 for the grand total of subjects.

TABLE 100

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 67 Day Class Retest Boys

Correlation	Achievement Subtest				
	PM	WM	S	AR	AC
WISC-					
Initial	.472*	.335*	.272	.634*	.697*
Final	.455*	.376*	.233	.705*	.712*
Gain	−.022	.019	−.086	.109	−.042
Behavior Rating Scale-					
Initial	.096	.109	.15[illegible]	.247	.325*
Final	.137	.128	.061	.223	.202
Gain	.069	.016	−.175	−.025	−.2[illegible]
Adjective Checklist-					
Initial	.121	.121	.179	.044	[illegible]1
Final	.196	.155	.207	.170	.091
Gain	.128	.038	.042	.168	−.065
Initial-					
Final	.820*	.819*	.859*	.707*	.851*
Gain	−.288	−.421*	−.311	−.361*	−.364*

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-4 = 63. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 101

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 41 Day Class Retest Girls

	Achievement Subtest				
Correlation	**PM**	**WM**	**S**	**AR**	**AC**
WISC-					
Initial	.708*	.580*	.312	.539*	.519*
Final	.578*	.566*	.403	.697*	.579*
Gain	−.135	−.097	.109	.239	.214
Behavior Rating Scale-					
Initial	.422*	.358	.306	.257	.391
Final	.399	.379	.361	.464*	.308
Gain	.002	−.014	.047	.327	−.037
Adjective Checklist-					
Initial	.023	.048	.292	−.180	.036
Final	−.131	−.032	.083	−.129	−.130
Gain	−.228	−.134	−.415*	.089	−.249
Initial-					
Final	.764*	.820*	.856*	.812*	.766*
Gain	−.269	−.417*	−.417*	−.334	−.127

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are $N\text{-}4 = 37$. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 102

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 42 Institutionalized Retest Boys

	Achievement Subtest				
Correlation	PM	WM	S	AR	AC
WISC-					
Initial	.655*	.622*	.711*	.805*	.792*
Final	.658*	.654*	.706*	.817*	.803*
Gain	.075	.061	.056	−.022	−.014
Behavior Rating Scale-					
Initial	−.017	.114	.061	.032	−.025
Final	.154	.255	.213	.270	.185
Gain	.332	.260	.464*	.384	.377
Adjective Checklist-					
Initial	−.053	.071	.147	.135	.086
Final	.183	.246	.272	.307	.186
Gain	.451*	.323	.391	.272	.176
Initial-					
Final	.861*	.853*	.944*	.816*	.847*
Gain	−.164	−.268	−.068	−.350	−.315

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are $N-4 = 38$. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 103

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 27 Institutionalized Retest Girls

	Achievement Subtest				
Correlation	PM	WM	S	AR	AC
WISC-					
Initial	.558*	.711*	.549*	.763*	.648*
Final	.646*	.692*	.577*	.666*	.690*
Gain	.294	−.129	.096	.044	.134
Behavior Rating Scale-					
Initial	.280	.482	.436	.612*	.430
Final	.415	.558*	.605*	.635*	.596*
Gain	.410	.104	.413	.250	.333
Adjective Checklist-					
Initial	.090	.272	.209	.360	.262
Final	.211	.293	.304	.420	.402
Gain	.360	.012	.232	.247	.270
Initial-					
Final	.940*	.900*	.903*	.884*	.829*
Gain	−.110	−.339	−.163	.080	−.204

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-4 = 23. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 104

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 109 Day Class and Institutionalized Retest Boys

	Achievement Subtest				
Correlation	PM	WM	S	AR	AC
WISC-					
Initial	.546*	.446*	.451*	.706*	.736*
Final	.539*	.489*	.432*	.751*	.750*
Gain	.015	.035	−.041	.062	−.030
Behavior Rating Scale-					
Initial	.050	.111	.114	.155	.178
Final	.144	.181	.126	.242	.195
Gain	.171	.108	.027	.124	.017
Adjective Checklist-					
Initial	.044	.099	.165	.085	.105
Final	.190	.195	.237	.231	.135
Gain	.261*	.152	.157	.206	.045
Initial-					
Final	.837*	.832*	.895*	.753*	.849*
Gain	−.239	−.366*	−.228	−.354*	−.343*

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are *N*-7 = 102. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 105

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 68 Day Class and Institutionalized Retest Girls

	Achievement Subtest				
Correlation	PM	WM	S	AR	AC
WISC-					
Initial	.644*	.627*	.403*	.621*	.558*
Final	.601*	.611*	.469*	.673*	.613*
Gain	−.031	−.108	.104	.169	.179
Behavior Rating Scale-					
Initial	.349*	.417*	.371*	.426*	.413*
Final	.404*	.466*	.492*	.555*	.467*
Gain	.126	.035	.217	.286	.155
Adjective Checklist-					
Initial	.052	.145	.255	.048	.150
Final	.016	.111	.187	.128	.127
Gain	−.062	−.080	−.151	.152	−.013
Initial-					
Final	.842*	.855*	.877*	.842*	.801*
Gain	−.212	−.385*	−.308*	−.170	−.167

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are *N*-7 = 61. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 106

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 108 Day Class Retest Subjects

Correlation	Achievement Subtest				
	PM	WM	S	AR	AC
WISC-					
Initial	.548*	.409*	.284*	.606*	.647*
Final	.496*	.434*	.283*	.702*	.672*
Gain	−.062	−.016	−.026	.141	.044
Behavior Rating Scale-					
Initial	.203	.186	.200	.250	.340*
Final	.226	.208	.151	.294*	.235
Gain	.044	.007	−.106	[illegible]	−.176
Adjective Checklist-					
Initial	.085	.095	.218	−.032	.094
Final	.074	.090	.164	.071	.014
Gain	−.015	−.021	−.115	.142	−.134
Initial-					
Final	.800*	.819*	.858*	.737*	.825*
Gain	−.280*	−.420*	−.343*	−.352*	−.292*

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are *N*-7 = 101. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

TABLE 107

Correlation Coefficients of WISC Full-Scale IQs and Behavior Rating Scale, Total Adjective Checklist, and Initial Stanford Achievement Subtest Scores with Initial, Final, and Gain Achievement Scores for 69 Institutionalized Retest Subjects

	Achievement Subtest				
Correlation	PM	WM	S	AR	AC
WISC-					
Initial	.620*	.645*	.659*	.794*	.743*
Final	.650*	.663*	.664*	.766*	.757*
Gain	.124	.011	.098	−.006	.034
Behavior Rating Scale-					
Initial	.106	.262	.211	.236	.159
Final	.259	.371*	.367*	.416*	.360*
Gain	.343*	.201	.440*	.330*	.357*
Adjective Checklist-					
Initial	−.002	.141	.168	.233	.148
Final	.193	.262	.253	.347*	.226
Gain	.422*	.228	.323*	.263	.211
Initial-					
Final	.890*	.869*	.929*	.834*	.840*
Gain	−.146	−.289	−.106	−.2[illegible]	−.272

Note.—Subtest titles are: PM, Paragraph Meaning; WM, Word Meaning; S, Spelling; AR, Arithmetic Reasoning; and AC, Arithmetic Computation. Degrees of freedom associated with each coefficient are N-7 = 62. Asterisk (*) indicates a coefficient significantly different from zero at a probability of .01 or less.

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